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November 2024

Blue Hills Quarry Flora and Fauna Impact Assessment

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Blue Hills Quarry Flora and Fauna Impact Assessment

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WSP acknowledges that every project we work on takes place on First Peoples lands. We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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Executive summary

Introduction

WSP Australia Pty Ltd (WSP) was engaged by E.B. Mawson & Sons Pty. Ltd. (Mawsons) to progress the ecological impact assessment and approvals documentations for the proposed ~36 hectares (ha) Blue Hills Quarry, and associated haul road (the Project) in Bradford, Victoria.

The purpose of this report is to relay the findings of recent site assessments and targeted surveys. These were undertaken with the purpose of verifying the ecological values identified in previous assessments and determining the potential ecological impacts of the proposed project.

This report was prepared in addition to, and supported by, previous assessments undertaken in 2021, 2022 and 2023 on the proposed quarry area and preferred haul road alignment.

Methodology

Desktop assessment

An initial gap analysis was undertaken covering the previous impact assessment report (Eco Logical Australia, 2023c) prepared for the project. Other previous ecological assessment reports were also reviewed for relevant information to inform likelihood of occurrence and impact assessments.

The gap analysis involved review, and where necessary, revision of the previous likelihood of occurrence assessments for threatened flora and fauna species and ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act).

Current database searches were undertaken by WSP on 28 February 2024. In keeping with previous assessments, all searches were undertaken on an investigation area that was centred on the extraction area (i.e. the quarry), and covered a 10 km radius.

The results were used to prepare a list of threatened flora and fauna species, ecological communities and migratory and/or marine listed species previously recorded or predicted to occur in the project area and the broader locality (listed under the EPBC Act and FFG Act). The following sources of information were queried:

- The Victorian Biodiversity Atlas (VBA) (DEECA, 2024d)
- Commonwealth EPBC Act Protected Matters Search Tool (PMST) (DCCEEW, 2024a).

Site assessment

Site assessment were undertaken by WSP ecologists between September and November 2023 and between 5-7 August 2024. These site assessments involved targeted surveys, habitat assessments and validation (or ground-truthing) to verify native vegetation patches previously mapped across the project area by Eco Logical Australia in May 2023, as per the *Guidelines for the removal, destruction or lopping of native vegetation (2017)* (the Guidelines) (DELWP, 2017c).

Vegetation Quality Assessments were undertaken on remnant patches of native vegetation to determine the condition of the vegetation in the context of the local area and the relevant bioregion (Goldfields). This methodology is outlined in *Vegetation Quality Assessment Manual-Guidelines for applying the habitat hectares scoring method* (DSE, 2004).

Targeted surveys for Clover Glycine were completed on 15 September, 19 October and 28-29 November 2023. Surveys were undertaken in areas of suitable habitat, completed on foot by suitably qualified and experienced botanists. Targeted surveys for Clover Glycine were inadvertently surveys for all threatened flora species potentially occurring. These surveys were considered adequate for the purpose of verifying previous survey results, and verifying likelihood of

occurrence assessments for all threatened flora species returned in database queries.

Previous assessments identified one EPBC Act listed Threatened Ecological Community within the project area; *Grey Box Eucalyptus microcarpa Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* (GBGW) (Eco Logical Australia, 2023a, Eco Logical Australia, 2023c). WSP ecologists undertook verification of previous Threatened Ecological Community assessment at two plots on 29 November 2023, a seasonally appropriate times as per the Federal assessment guidelines (DSEWPaC, 2012), and Conservation and Listing advice (TSSC, 2010) for this community.

Swift Parrot is listed as Critically Endangered under both the EPBC Act and FFG ACT. Habitat for this species was previously assessed as being the entire project area (i.e. ~37.4 ha) (Eco Logical Australia, 2023c). In order to determine a more accurate area of impact, WSP ecologists assessed potential Swift Parrot habitat by refining the canopy coverage estimate of key foraging tree species.

A summary of WSP survey effort, dates and key references are provided below in Table ES.1.

Table ES.1	Summary of site assessments and targeted survey effort

SURVEY & ASSESSMENT	SURVEY DETAILS	DATE	REFERENCE	
Native Vegetation Assessment – Quarry site	Vegetation Quality Assessments	28 November 2023 29 November 2023	Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual – guidelines for applying the habitat hectares scoring method version 1.3 (DSE, 2004).	
Clover Glycine targeted surveys	Linear transects across potential habitat	 September 2023 October 2023 November 2023 November 2023 	SPRAT profile for Glycine latrobeana - Clover Glycine, Purple Clover [Online] (DCCEEW, 2024c)	
Threatened Ecological Community	Floristics – coverage and diversity quadrats 1m x 1m	29 November 2023	Grey Box Grassy Woodlands and Derived Native Grasslands of South Eastern Australia: A guide to the identification, assessment and management of a nationally threatened ecological community (DSEWPaC, 2012) Commonwealth Listing Advice on Grey Box (<i>Eucalyptus</i> <i>microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (TSSC, 2010)	
Swift Parrot targeted surveys	Habitat assessment	19 October 2023 28-29 November 2023	<i>National Recovery Plan for the Swift Parrot</i> (Saunders and Tzaros, 2011).	
Native Vegetation Assessment – Haul road alignment	Collect tree data along Stones Road	5-7 August 2024	Guidelines for the removal, destruction or lopping of native vegetation (2017) (the Guidelines) (DELWP, 2017c).	

Results

Significant flora species

Five significant flora species listed under the FFG Act were recorded by Eco Logical Australia and/or WSP and one flora species was considered to have a moderate likelihood of occurrence based on suitable potential habitat present within the project area. WSP records are shown in Figure A.3.

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Significant nora species	Dieseni or with a moderate	or nigher likelinggg of occurrence
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COMMON NAME	SCIENTIFIC NAME	STATUS	LIKELIHOOD OF OCCURRENCE	RECORDED BY
Buloke	Allocasuarina luehmannii	cr	Recorded – 2 individuals	ELA 2022
				WSP 2023
Golden Cowslips	Diuris behrii	en	Recorded – 2 individuals	ELA 2022
Late-flower Flax-lily	Dianella tarda	cr	Recorded – 24 individuals recorded, but only two individuals occur within the project area.	ELA 2023
Glaucous Flax-lily^	Dianella longifolia var. grandis	cr	Recorded – 2 individuals	WSP 2023
Small-flower Wallaby-grass	Rytidosperma monticola	en	Recorded – 100+ individuals recorded by both consultants.	ELA 2022 WSP 2023
Southern Swainson-pea	Swainsona behriana	en	Moderate	-

Table legend

FFG Act: cr = critically endangered, en = endangered

[^]Not considered likely to occur or recorded by previous consultants

Significant fauna species

Following detailed desktop assessment and verification of previous assessments, a total of 22 significant fauna species have either been recorded or are considered to have a moderate or high likelihood of occurrence within the project area. The breakdown is as follows:

- Seven species were given a moderate likelihood of occurrence based on suitable habitat within the project area. These species included: Bearded Dragon *Pogona barbata* Black Falcon *Falco subniger*, Cattle Egret *Bubulcus ibis*, Crested Bellbird *Oreoica gutturalis*, Fork-tailed Swift *Apus pacificus*, Painted Honeyeater *Grantiella picta* and White-throated Needletail *Hirundapus caudacutus*.
- Five species were given a high likelihood of occurrence based on previous records in the area and site suitability: Barking Owl Ninox connivens, Grey-crowned Babbler Pomatostomus temporalis, Little Eagle Hieraaetus morphnoides, Southern Whiteface Aphelocephala leucopsis and Turquoise Parrot Neophema pulchella.
- Ten significant fauna species were recorded within the project area by WSP and/or during previous ecological assessments (Habitat Management Services, 2021, Eco Logical Australia, 2023a, Eco Logical Australia, 2023c). These species include Black-eared Cuckoo *Chalcites osculans*, Brown Treecreeper (south-eastern) *Climacteris picumnus (victoriae)*, Brush-tailed Phascogale *Phascogale tapoatafa*, Diamond Firetail *Stagonopleura guttata*, Hooded Robin *Melanodryas cucullate*, Lace Monitor *Varanus varius*, Rainbow Bee-eater *Merops ornatus*, Speckled Warbler *Pyrrholaemus sagittatus*, Square-tailed Kite *Lophoictinia isura* and Swift Parrot *Lathamus discolor*.

COMMON NAME	SCIENTIFIC NAME	STATUS	LIKELIHOOD OF OCCURRENCE	RECORDED
Barking Owl	Ninox connivens	cr	High - precautionary principle applied	HMS 2021
Bearded Dragon	Pogona barbata	vu	Moderate	-
Black-eared Cuckoo	Chalcites osculans	Mr	Recorded	ELA 2022
Black Falcon	Falco subniger	cr	Moderate	-
Brown Treecreeper (south-eastern)	Climacteris picumnus (victoriae)	VU	Recorded	HMS 2021 ELA 2022

Table ES.3	Significant fauna species present or with a moderate o	or higher likelihood of occurrence
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COMMON NAME	SCIENTIFIC NAME	STATUS	LIKELIHOOD OF OCCURRENCE	RECORDED
Brush-tailed Phascogale	Phascogale tapoatafa	vu	Recorded	HMS 2021
Cattle Egret	Bubulcus ibis	Mr	Moderate	-
Crested Bellbird	Oreoica gutturalis	en	Moderate	-
Diamond Firetail	Stagonopleura guttata	VU, vu	Recorded	HMS 2021 ELA 2022
Fork-tailed Swift	Apus pacificus	M, Mr	Moderate	-
Grey-crowned Babbler	Pomatostomus temporalis	vu	High - recorded within the broader property, but outside of the proposed quarry footprint.	HMS 2021 WSP 2023
Hooded Robin	Melanodryas cucullata	EN, vu	Recorded	HMS 2021 ELA 2022
Lace Monitor	Varanus varius	en	Recorded	ELA 2022
Little Eagle	Hieraaetus morphnoides	vu	High - recorded within the broader property, but outside of the proposed quarry footprint.	HMS 2021
Painted Honeyeater	Grantiella picta	VU, vu	Moderate	-
Rainbow Bee-eater	Merops ornatus	Mr	Recorded	ELA 2022 WSP 2023
Southern Whiteface [^]	Aphelocephala leucopsis	VU	High - recorded within the broader property, but outside of the proposed quarry footprint.	WSP 2023
Speckled Warbler	Pyrrholaemus sagittatus	en	Recorded	HMS 2021 ELA 2022
Square-tailed Kite	Lophoictinia isura	vu	Recorded	ELA 2022
Swift Parrot	Lathamus discolor	CR, Mr, cr	Recorded	HMS 2021 ELA 2023
Turquoise Parrot	Neophema pulchella	vu	High - recorded within the broader property, but outside of the proposed quarry footprint.	HMS 2021
White-throated Needletail	Hirundapus caudacutus	VU, M, Mr	Moderate	-

<u>Table legend</u>

EPBC Act: CR = Critically Endangered, EN = Endangered, VU = Vulnerable, M = Migratory, Mr = Marine FFG Act: cr = critically endangered, vu = vulnerable, en = endangered^Not considered likely to occur or recorded by previous consultants

Gap analysis and verification

After site assessments and targeted surveys, WSP has differing results and/or departs with the findings and conclusions presented in the previous assessments as follows:

- WSP recorded one additional significant flora species within the proposed quarry site, Glaucous Flax-lily *Dianella longifolia* var. *grandis*, which is listed as critically endangered under the FFG Act. This species has not been previously recorded within the project area.
- WSP re-evaluated the likelihood of occurrence of Clover Glycine *Glycine latrobeana*, Southern Shepherd's Purse *Ballantinia antipoda* and Crimson Sun-orchid *Thelymitra X macmillanii*. These species were previously determined to have a moderate likelihood of occurrence by Eco Logical Australia despite not being recorded (Eco Logical Australia, 2023c).

- WSP re-evaluated the likelihood of occurrence for Southern Whiteface *Aphelocephala leucopsis* after it was
 recorded within the broader property by WSP in August 2024. This species was previously considered to have a low
 likelihood of occurrence by Eco Logical Australia (Eco Logical Australia, 2023c), but has since been re-evaluated to
 high.
- The previous habitat assessment for Swift Parrot *Lathamus discolor* required revision as previous assessments had deemed the entire project area (i.e. ~37.4 ha) as being suitable habitat for the species (Eco Logical Australia, 2023c). WSP revised this to be on an area of canopy basis, which was extrapolated from canopy point-intersect transect results. The revised area of Swift Parrot habitat is considered to be approximately 24.71 ha.
- WSP concurs with Eco Logical Australia's determination of EPBC Act listed GBGW presence along Bridgewater-Maldon Road. However, WSP has re-evaluated the extent of the GBGW patch to match the extent of Plains Woodland EVC mapped in this area.
- Vegetation Quality Assessments and qualification of Threatened Ecological Communities were verified by WSP.

Clover Glycine targeted surveys

Cover Glycine is listed as Vulnerable under the EPBC Act and vulnerable under the FFG Act. Clover Glycine targeted surveys were undertaken by WSP ecologists on four separate occasions during Spring 2023 from around mid-September to end-November, in line with the species known flowering period (Carter and Sutter, 2010). Surveys were intentionally undertaken at the beginning, middle and end of spring to account for any variability in the species' flowering period that year. Clover Glycine was not observed during these surveys.

Swift Parrot habitat assessment

A total of 277 points were taken at 10 m intervals along seven transects throughout the proposed quarry site. Of these, 186 points (67%) intersected the presence of a key foraging tree species. This percentage was then used to refine the area of impact to Swift Parrot habitat as a result of the project, resulting in an area of approximately 24.71 ha.

Native Vegetation

Upon assessment, WSP concurred that the proposed quarry area supported one patch of Hillcrest Herb-rich Woodland (EVC 70), which extends to the eastern boundary of the quarry, and a smaller patch of Plains Woodland (EVC 803) along the north-western boundary of the quarry.

Previously, three patches of native vegetation were mapped within the haul road alignment by Eco Logical Australia. The small patch of Plains Woodland along Murphy Road was determined by WSP to have < 25% cover and was therefore not considered to be a patch of native vegetation. Of the reaming two patches that were previously mapped, one is no longer relevant to the assessment due to the updated alignment footprint. Therefore, only one patch of Plains Woodland (EVC 803) now intersects the current haul road alignment.

Trees

Trees within a 20 m buffer of the project area were recorded. Note, this assessment did not account for small trees in patches, except for those associated with the haul road alignment which were recorded to determine impacts as a result of Tree Protection Zone (TPZ) encroachment. A total of 128 trees were recorded. Of these, one is a large, scattered tree as per the most appropriate EVC benchmark. Of the remaining trees, 106 are large canopy trees in patches and 21 are small trees in patches (located along the haul road alignment).

Ecological Communities

WSP assessment results align with previous assessment determinations, that the project area supported patches of EPBC Act listed Threatened Ecological Community *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* (GBGW) and FFG Act listed threatened community; Victorian Temperate Woodland Bird Community (VTWBC).

Impact assessment

The proposed project are likely to result in the loss of 36.884 ha of native vegetation¹. The impact of this loss on federal and state listed flora, fauna and ecological communities are discussed below.

Potential impacts on EPBC Act MNES

A total of 15 MNES considered for potential significant impacts as per the *Matters of National Environmental Significance Significant impact guidelines 1.1* (Department of the Environment, 2013), or the otherwise most appropriate Commonwealth guidelines.

In summary, one Threatened Ecological Community (2.60 ha of GBGW) and six significant fauna species listed under the EPBC Act are considered to have a moderate or higher likelihood of occurrence based on the presence of high-quality suitable habitat, nearby records and/or the results and timing of previous surveys. This includes Blue-winged Parrot, Brown Treecreeper, Diamond Firetail, Hooded Robin, Southern Whiteface and Swift Parrot. Assessment under the relevant significant impact criteria were completed for each and determined that the Threatened Ecological Community and five of the six EPBC Act listed fauna species were at risk of being significantly impacted by the proposed project. The results are summarised in Table ES.4.

 Table ES.4
 Summary of EPBC listed species and Threatened Ecological Communities considered to have at least a moderate risk of a significant impact

MNES	SCIENTIFIC NAME	EPBC ACT STATUS	AREA OF IMPACT (HA)^	RISK OF SIGNIFICANT IMPACT	
SIGNIFICANT F	AUNA				
Brown Treecreeper	Climacteris picumnus (victoriae)	Vulnerable	36.884	High risk of a significant impact on the occupancy of the species, habitat critical to its survival, and potential disruption to breeding cycles of the species.	
Diamond Firetail	Stagonopleura guttata	Vulnerable	36.884	High risk of a significant impact on the occupancy of the species, habitat critical to its survival, and potential disruption to the breeding cycles of the species.	
Hooded Robin	Melanodryas cucullata	Endangered	36.884	High risk of a significant impact occupancy of the species, habitat critical to its survival, and potential disruption to breeding cycles of the species.	
Southern Whiteface	Aphelocephala leucopsis	Vulnerable	36.884	High risk of a significant impact to habitat critical to the species survival.	
Swift Parrot	Lathamus discolor	Critically Endangered, Marine	24.71	High risk of a significant impact on the occupancy of the species and the availability of habitat critical to the survival of this species.	
THREATENED ECOLOGICAL COMMUNITY					
Grey Box Grassy Woodland and Derived Native Grassland of South-eastern Australia		Endangered	2.60 ha	High risk of a significant impact on this community.	

¹ Area is exclusive of the one large Scattered Tree area (0.07 ha) – which is accounted for as an area, per the Guidelines

Potential Impacts on FFG Act listed values

According to the findings of WSP surveys, and the results of previous assessments, a total of five FFG Act listed flora species have been recorded. This includes Buloke, Golden Cowslips, Glaucous Flax-lily, Late-flower Flax-lily and Small-flower Wallaby-grass. Impacts are anticipated to all five of these species as they are located within the project area. In addition, a total of three FFG Act protected flora species listed as 'Generally protected flora' and 10 FFG Act protected flora' were also recorded during the WSP site assessment.

According to the findings of WSP surveys, and the results of previous assessments, seven FFG Act listed fauna species have been recorded within the project area. This includes one mammal Brush-tailed Phascogale, one reptile Lace Monitor and five birds comprising Diamond Firetail, Hooded Robin, Speckled Warbler, Square-tailed Kite and Swift Parrot. In addition, eight FFG Act listed fauna species are considered to have a moderate or higher likelihood of occurrence based on the presence of high-quality suitable habitat, nearby records and/or the results and timing of previous surveys.

One FFG Act listed ecological community, Victorian Temperate Woodland Bird Community (VTWBC), was recorded within the project area. This FFG Act listed ecological community is considered to occur across all native vegetation patches within the project area, equating to a total area of 36.884 ha.

Native vegetation

Vegetation clearance as per *the Guidelines* is summarised in terms of EVC. One patch of Hillcrest Herb-rich Woodland EVC 70 (34.281 ha) and two patches of Plains Woodland EVC 803 (2.603 ha) are proposed for removal, equating to a total impact area of 36.884 ha².

In addition, 72 large trees (≥70 cm DBH) in patches and one large, scattered tree will be impacted by the proposed works.

Legislation

LEGISLATION	SUMMARY OF IMPLICATIONS
COMMONWEALT	H LEGISLATION
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Assessment under the relevant significant impact criteria were completed for each MNES according to the <i>Matters of National Environmental Significance Significant impact guidelines 1.1</i> (Department of the Environment, 2013). The detailed assessments for each MNES are provided in Appendix E and a summary is provided above in Table ES.4. One MNES (Listed threatened species and communities) was identified as having a high risk of a significant impact as a result of the proposed project. This includes five EPBC Act listed species and one Threatened Ecological Community. It is recommended that the action be referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for potential implications under the EPBC Act.
STATE LEGISLAT	ΓΙΟΝ
Environment Effects Act 1978	Assessing against both individual and cumulative assessment criteria of the Ministerial Guidelines (DTP, 2023), one individual criteria, and potentially two combined criteria, are likely to be considered met. An Environment Effects Statement (EES) may potentially be required by the Minister for Planning.

Table ES.5 Summary of anticipated implications under relevant biodiversity legislation

² Area is exclusive of the one large Scattered Tree area (0.07 ha) – which is accounted for as an area, as per the Guidelines

LEGISLATION	SUMMARY OF IMPLICATIONS
	This conclusion is due to potential impacts to native vegetation (including an FFG Act listed ecological community) and potential impacts to FFG Act listed species, namely Small-flower Wallaby-grass. It is worth noting that there are other referral triggers that will need to be considered, however these are beyond the scope of an ecology assessment.
Flora and Fauna Guarantee Act 1988 (FFG Act)	The permit requirement under Section 47 of the FFG Act does not apply to most of FFG Act listed biodiversity values recorded within the project area, as they occur on private land or are listed as 'Restricted use protected flora' (which do not require a 'permit to take').
	The exception is two Late-flower Flax-lily that occur within the haul road alignment along Stones Road. A Permit under Section 47 of the FFG Act will be required for their removal. A Permit under Section 47 of the FFG Act will also apply to removal of VTWBC on Bridgwater-Maldon Road and Stones Road.
Planning and Environment Act 1987 (P&E Act)	Clause 52.17 of the Mount Alexander Planning Scheme requires a permit for the clearance of native vegetation as per the Guidelines, and consideration given to the three-step approach of <i>avoidance, minimisation</i> and <i>offsetting</i> of native vegetation clearance.
	A Native Vegetation Removal (NVR) report was generated to determine the impacts and offset requirements associated with the project. The NVR report indicates that potential total impacts (including the scattered tree) equate to an extent of 36.954 ha, as per NVR report data standards (DELWP, 2017b). Vegetation removal will follow a Detailed Assessment Pathway.
	The offset target for clearance of all vegetation across the project area is 73 Large Trees and nine Species Habitat Units (ranging from $\sim 46 - 52$ species units). Preliminary offset investigations and NVR report testing indicate it is possible the proponent will be able to achieve the required species units via a first-party offset scenario with habitat contiguous with the impact area.
Water Act 1989	Several mapped watercourses that intersect the project area, including a farm dam in the top north- west corner of the quarry which provides drinking water for fauna, especially birds, and habitat for common frogs (Eco Logical Australia, 2023a). However, many of the mapped watercourses did not contain water at the time of WSP's assessment and are highly degraded.
	Providing the implementation of appropriate mitigation measures to reduce the risk of sedimentation, run-off and erosion, the project is unlikely to have extensive impacts on the environmental value of these waterways.
Wildlife Act 1975	During construction, pre-clearing survey and clearance monitoring, (including salvage and relocation) is recommended for any areas of key habitat which are proposed to be impacted. This should include all large trees, shrubby vegetation, and wetland areas (i.e. the dam). The qualified and experienced ecologist undertaking this work must have a current management authorisation under this Act.
Catchment and Land Protection (CaLP) Act 1994	Regionally Controlled weeds within the project area include: Common Prickly-pear * <i>Opuntia stricta</i> and Golden Thistle * <i>Scolymus hispanicus</i> , Horehound * <i>Marrubium vulgare</i> and Wheel Cactus * <i>Opuntia robusta</i> , as well as two Restricted weeds, Saffron Thistle * <i>Carthamus lanatus</i> and Spear Thistle * <i>Cirsium vulgare</i> .
	Measures to control both noxious weeds and pest animals (i.e. foxes) during construction must be included in a Construction Environmental Management Plan (CEMP).

Conclusion and recommended next steps

The project has the potential to impact on numerous threatened flora and fauna species, and ecological communities listed under the EPBC Act and FFG Act.

Implications under ecologically relevant legislation are anticipated, including:

- 1 A referral of the project (or 'action') has a high risk of significant impacts to MNES listed under the EPBC Act.
- 2 Assessing against both individual and cumulative assessment criteria of the Ministerial Guidelines (DTP, 2023), one individual criteria, and potentially two combined criteria, are likely to be considered met. An EES may potentially be required by the Minister for Planning under the EE Act.
- 3 The project is likely to require onerous species offsets to satisfy clause 52.17 requirements under the P&E Act.

Recommended next steps

 Engage an arborist to undertake a detailed arboricultural impact assessment to determine the retention potential of all trees around /outside the project area.

Upon completion of the arborist assessment, the NVR report should be updated to reflect any additional impacts to trees located outside, but near the project area boundary. Upon approval of this document, a Native Vegetation Removal (NVR) report should be sourced from DEECA to replace the current EnSym report.

- All recommendations to minimise and mitigate impacts provided in section 5 should be incorporated into project planning and design.
- It is recommended this project be referred to DCCEEW for likely significant impacts to MNES.
 - It is recommended that referral documentation be drafted and approved by the proponent.
 - It is recommended that a pre-referral meeting be arranged with DCCEEW following drafting of a referral.
- It is recommended this project be referred to the Minister for Planning to assess the potential requirement for an EES. Consultation with the impact assessment unit of Department of Transport and Planning (DTP) should be undertaken to:
 - Organise a pre-referral meeting to provide an overview of the project and associated ecological effects.
 - Discuss the suitability of this documentation, to support an EES if required.
 - Investigate the potential of a bilateral agreement for assessment.
- State and Federal offset investigations should be progressed to further understand feasibility of achieving all
 potentially required offsets. It is recommended this be progressed in the form of an offset strategy.

1 Introduction

WSP Australia Pty Ltd (WSP) was engaged by E.B. Mawson & Sons Pty. Ltd. (Mawsons) to progress the ecological impact assessment and approvals documentation for the proposed ~36 hectare (ha) Blue Hills Quarry and associated haul road (the Project) in Bradford, Victoria.

The purpose of this report is to document the findings of recent site assessments and targeted surveys completed by WSP ecologists. These were undertaken with the purpose of verifying the ecological values identified in previous assessments and determining the potential ecological impacts of the proposed project.

This report was prepared in addition to, and supported by, previous assessments undertaken and completed between 2021-2023 for the proposed quarry area and haul road alignment options.

1.1 PROJECT OVERVIEW

Mawsons propose to develop a hornfels hard-rock quarry in Bradford, located within the Mount Alexander Shire Local Government Area (LGA). The hornfels deposits at Blue Hills provide a high-quality market resource for regional infrastructure development. The quarry would have a peak operating production of 500,000 tonnes per annum of processed hornfels aggregate and an anticipated lifetime of 70 to 100 years.

1.1.1 Key project components

Key construction activities of the project relate to the site establishment and construction of fixed infrastructure associated with the quarry area and the haul road. The main components are the quarry site, processing facility (located within the quarry footprint), product stockpiling area, vehicle workshop and office. The ultimate footprint of the quarry and processing facility is approximately 33 ha, while the stockpiling area, vehicle workshop and office area comprises an additional three hectares.

Site establishment, access and haul road construction involves:

- Establishment of construction environmental controls (i.e., exclusion fencing, delineation of quarry site, fauna relocation, sediment controls).
- Staged vegetation grubbing/removal.
- Construction of access / haul roads and associated drainage.
- Topsoil stripping and stockpiling.

1.2 PROJECT AREA

The project area is located in Bradford, approximately 10 kilometres (km) north-west of Maldon, and 130 km north-west of Melbourne Central Business District (CBD), Victoria.

The project area consists of the proposed quarry which covers approximately 36 ha, situated within a larger 560 ha private property owned by Mawsons. The project area also includes a haul road alignment which will provide access to the quarry from Bridgewater-Maldon Road – Figure 1.1 below.

The proposed quarry portion of the project area is predominantly covered by remnant native vegetation. Historically, parts of the land have been utilised for forestry activities. However, since Mawsons' acquisition of the property, no active timber harvesting activities have occurred and development on the property has been limited to a dam, fencing and informal tracks. This contrasts the surrounding fragmented landscape which has been extensively cleared for primary production enterprises and rural residential uses.

The proposed haul road alignment is predominately located within farming paddocks, with some native vegetation present along Stones Road and near Bridgewater-Maldon Road. The haul road alignment presented in this report is the most recent variation that was suggested by Mawsons in May 2024 (i.e. a modified version of haul road alignment Option 8 assessed by Eco Logical Australia in *Blue Hills Quarry Haul Road Ecological Assessment* (Eco Logical Australia, 2023b)). This variation was made in an effort to avoid impacting a native creekline located near the Stones Road and Bridgewater-Maldon Road intersection.

The project area is zoned as a Farming Zone (FZ) under the Mount Alexander Planning Scheme and is located within the North Central Catchment Management Authority (CMA) region and the Goldfields bioregion (DTP, 2024, DEECA, 2024c).

1.3 PROJECT SCOPE

In order to verify the ecological values present and assess potential impacts as a result of the project, the following scope of works were undertaken within the project area:

- A site survey to verify previous assessments of ecological values across the proposed impact area. Results of
 previous assessments were verified and assessed for:
 - Identification and mapping of native vegetation, including mapping of patches and scattered trees, defined as per the *Guidelines for the removal, destruction or lopping of native vegetation (2017)* (the Guidelines) (DELWP, 2017c).
 - Classification of vegetation into one of three categories, in accordance with the Guidelines policy:
 - Native vegetation patches
 - Scattered trees
 - Areas of non-native vegetation with less than 25% native flora understorey cover.
 - Vegetation Quality Assessments (VQA) (DSE, 2004) on all patches of native vegetation.
 - Identification of prohibited and environmental weeds/pests and their general location.
 - Identification of ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Flora and Fauna Guarantee Act 1988* (FFG Act).
 - Identification of occurrences and assessment of habitat for EPBC Act and/or FFG Act listed flora or fauna species present in the project area, or considered likely to occur, including:
 - Targeted surveys for Clover Glycine *Glycine latrobeana* with the intention of determining the project area as either habitat for this species (observed), or this species having a low likelihood of occurrence (not observed).
 - Swift Parrot *Lathamus discolor* habitat assessment in terms of canopy area of favourable Eucalypt species to determine a more accurate area of impact for this species.
- Preparation of this ecological impact assessment report, including:
 - Reviewing and where necessary, revising the assessment of the likelihood of occurrence of threatened flora and fauna species and communities listed under the EPBC Act and FFG Act.
 - Undertaking an evaluation of implications of relevant biodiversity policy and legislation and triggers for permits (e.g. FFG permit, EPBC referral, permit to remove native vegetation etc).





PS134125 Mawson Quarries - Blue Hills

> **Figure 1** Project Area

Legend

- --- Roads
- Watercourses
 - Cadastre
- Project Area

Mawson's owned land



2 Methodology

2.1 PERSONNEL

Table 2.1

The contributors to this study, their qualifications and project roles are outlined in Table 2.1.

NAME	QUALIFICATIONS	POSITION AND ROLE/S ON PROJECT		
Justin Pegg	BSc, M. Env&Sus	Associate Ecologist – vegetation assessment, flora surveys, review		
Danelle Scicluna	BEnvSc	Ecologist – report preparation		
Nic McCaffrey	BSc	Principal Ecologist – flora surveys, vegetation assessments, report approval		
Mark Shepherd	BEnvSc	Senior Ecologist – vegetation assessments and flora surveys		
Imogen Merlo	BSc, M. Env	Senior Ecologist – fauna surveys and flora surveys		
Tia Gaburch	BSc (Hons) in Biological Sciences	Senior Environmental Consultant – report preparation		
Emi Arnold	BSc	Ecologist – fauna surveys, flora surveys, report preparation		
Angus Houston	BEnvSc	Ecologist – vegetation assessments		

Contributors and their roles

2.2 DOCUMENT REVIEW AND VALIDATION

An initial gap analysis was undertaken whereby previous ecological assessment reports related to the Project were reviewed for relevant information, to inform likelihood of occurrence and impact assessments. The previous reports reviewed included:

- Ecological assessment of threatened species presence at the proposed Blue Hills quarry. Prepared for Mawsons Concrete & Quarries (Habitat Management Services, 2021)
- Blue Hills Quarry Stage 2 Ecological Assessment. Prepared for Mawsons Concrete and Quarries (Eco Logical Australia, 2023a).
- Blue Hills Quarry Haul Road Ecological Assessment. Prepared for Mawsons Concrete and Quarries (Eco Logical Australia, 2023b).
- Blue Hills Quarry Impact Assessment. Prepared for Mawsons Concrete and Quarries (Eco Logical Australia, 2023c).

2.2.1 Likelihood of occurrence

The gap analysis involved review, and where necessary, revision of the previous likelihood of occurrence assessments for threatened flora and fauna species and ecological communities listed under the Commonwealth EPBC Act and/or Victorian FFG Act.

Up-to-date database searches were undertaken by WSP on 28 February 2024. In keeping with previous assessments, all searches were undertaken on an investigation area that was centred on the extraction area (i.e. the quarry), and covered a 10 km radius.

The results were used to prepare a list of threatened flora and fauna species, ecological communities and migratory and/or marine listed species previously recorded or predicted to occur in the project area and the broader locality (listed under the EPBC Act and FFG Act). The following sources of information were consulted:

- The Victorian Biodiversity Atlas (VBA) (DEECA, 2024d)
- Commonwealth EPBC Act Protected Matters Search Tool (PMST) (DCCEEW, 2024a)

The presence or absence of a particular species cannot be definitively determined during a relative short survey timeline. The likelihood of occurrence of significant species and populations was determined based on the criteria shown in Table 2.2. To determine the likelihood of a species occurring in the project area, this method uses the habitat requirements of the species, outcomes of an on-site habitat assessment, the state of habitat connectivity, results from previous assessments, historical and recent records as identified in the VBA and modelled presence from the PMST.

The likelihood of occurrence assessment results were then compared to those presented in the previous impact assessment report (Eco Logical Australia, 2023c) to identify and explore any areas of difference.

LIKELIHOOD	DESCRIPTION
Negligible	Species considered to have a negligible likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria:
	 rely exclusively on specific habitat types or resources that are not present in the project area are locally or regionally extinct.
Low	Species considered to have a low likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria:
	 have not been recorded previously in the project area and surrounds and for which the project area is beyond the current distribution range
	 there is no preferred habitat in the project area but the species' habitat requirements are not well understood
	 are considered to have the potential to be locally extinct are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
	 are cryptic flowering flora species that were specifically targeted by thorough seasonal surveys and that have not been recorded, and where habitat is suboptimal or there are no past records.
Moderate	Species considered to have a moderate likelihood of occurrence include species not recorded during the field surveys that fit one or more of the following criteria:
	 have infrequently been recorded previously in the project area and surrounds use habitat types or resources that are present in the project area, although generally in a poor or modified condition
	 are unlikely to maintain sedentary populations, however, may seasonally use resources within the project area opportunistically during variable seasons or migration
	 are cryptic flowering flora species that were targeted by seasonal surveys and that have not been recorded but where habitat is optimal or there are past records.
High	Species considered to have a high likelihood of occurrence include species not recorded that fit one or more of the following criteria:
	 have frequently been recorded previously in the project area and surrounds use habitat types or resources that are present in the project area, that are abundant and/or in good condition within the project area are known or likely to maintain resident populations surrounding the project area
	 are known or likely to visit the project area during regular seasonal movements or migration.
Recorded	Recorded/observed during field surveys undertaken by WSP and/or by previous consultants.

 Table 2.2
 Likelihood of occurrence criteria for threatened flora and fauna species

2.3 SITE ASSESSMENT

Site assessments, including targeted surveys and habitat assessments, were undertaken by WSP ecologists between September and November 2023 and again in August 2024. The following sections detail the methodologies used.

2.3.1 Categorising vegetation within the project area

Field validation (or ground-truthing) was undertaken by WSP to verify native vegetation patches previously mapped across the project area by Eco Logical Australia in May 2023, as per the Guidelines (DELWP, 2017c).

Native vegetation is defined in planning schemes as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. The Guidelines further classify native vegetation as a patch or a scattered tree as follows.

A patch of native vegetation as per the Guidelines (DELWP, 2017c), is:

- an area of vegetation where at least 25 per cent (%) of the total perennial understorey plant cover is native, or
- any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
- any mapped wetland included in the 'Current wetlands map', available in the Department of Energy, Environment and Climate Action (DEECA) systems and tools.

A scattered tree is a native canopy tree, over 3 m in height, that does not form part of a patch.

2.3.2 Vegetation Quality Assessments

Vegetation Quality Assessments (VQAs) were undertaken on remnant patches of native vegetation to determine the condition of the vegetation in the context of the local area and the relevant bioregion (Goldfields). This methodology is outlined in *Vegetation Quality Assessment Manual-Guidelines for applying the habitat hectares scoring method* (DSE, 2004). The VQA method involves making visual and quantitative assessments on various characteristics of native vegetation according to established criteria that are set against an optimum benchmark. This process aims to establish the significance of native vegetation through an objective and repeatable methodology using working documents (benchmark data and field assessment score sheets) that are uniformly applied across Victoria.

In summary, this process begins with the identification of the Ecological Vegetation Class (EVC). Each EVC has a benchmark of optimal values which are found on DEECA's website (DEECA, 2024a). Site assessments are undertaken using the DSE *Vegetation Quality Field Assessment Sheet* (Version 1.3 October 2004) (DSE, 2004). Further to the site condition criteria, the VQA process also requires an assessment of the site in a landscape context (DSE, 2004).

If a site meets or exceeds all benchmark criteria it will receive a total score of 100, which is a total of the above condition and landscape scores in pristine undisturbed condition. However, in many of the urban-influenced ecosystems in the Melbourne area, sites receive a score less than 60 due to their relatively high level of modification. The final habitat score is presented as a percentage and then converted to a score out of 1.00.

Patches of native vegetation within the proposed quarry site were verified and VQAs were undertaken on 28-29 November 2023 by WSP ecologists Justin Pegg and Mark Shepherd, who were at the time accredited by DEECA in the VQA method. These assessments were completed without reference to the VQA scores assigned by Eco Logical Australia, in order to mitigate potential assessor bias.

WSP ecologists visited the project area again between the 5-7 August 2024 to assess the haul road alignment (which was newly proposed by Mawsons in May 2024 as an alternative to previous alignment options). WSP also verified VQA scoring of native vegetation along Stones Road (i.e. the haul road alignment) undertaken by Eco Logical Australia (Eco Logical Australia, 2023c).

2.4 TARGETED SURVEYS & ASSESSMENTS

2.4.1 Clover Glycine targeted surveys

Clover Glycine *Glycine latrobeana* is listed as Vulnerable under both the EPBC Act and FFG Act. The previous impact assessment determined that, following targeted surveys, Clover Glycine had a moderate likelihood of occurrence, despite no identified occurrences within the project area (Eco Logical Australia, 2023c).

WSP ecologists undertook further targeted surveys for Clover Glycine, with the intention of more definitively determining the project area as either habitat for this species (observed), or the species having a low likelihood of occurrence (not observed). Targeted surveys for Clover Glycine were undertaken on 15 September, 19 October and 28-29 November 2023 in areas of suitable habitat, completed on foot by suitably qualified and experienced botanists (refer to Table 2.4). Surveys were undertaken systematically by using parallel line traverses a predetermined width apart (i.e. linear transects). Survey effort was recorded and mapped using GPS tracks of the surveyors (refer to Figure A.1).

Detectability of Clover Glycine is difficult unless it is in flower or contains seed pods (DCCEEW, 2024c). Therefore, surveys were undertaken in Spring 2023, to coincide with the species flowering period to increase the chances of detectability should the species be present on site.

Targeted surveys for Clover Glycine were inadvertently also surveys for all threatened flora species potentially occurring. All threatened flora species returned in database queries are seasonally observable around the mid-September to end-November period. Target surveys for Clover Glycine were considered adequate for the purpose of verifying previous survey results, and verifying likelihood of occurrence assessments for all threatened flora species returned in database queries.

All observations of significant flora species were recorded by a hand-held GPS integrated with a high-accuracy Global Navigation Satellite System (GNSS) receiver. Populations were mapped by points unless high densities were present, in which case polygons were used.

2.4.2 Threatened ecological community assessment

Previous assessments identified one EPBC Act listed Threatened Ecological Community within the project area; *Grey Box Eucalyptus microcarpa Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* (Eco Logical Australia, 2023a, Eco Logical Australia, 2023c).

WSP ecologists undertook verification of previous Threatened Ecological Community assessments at two plots on 29 November 2023, a seasonally appropriate times as per the Federal assessment guidelines (DSEWPaC, 2012), and Conservation and Listing advice for this community (TSSC, 2010). The assessment involved collecting vegetation percentage cover estimates via 1 m x 1 m quadrats. This was used to assess native vegetation present against assessment criteria specific to that listed community, to determine its presence or absence within the project area.

The locations of plots for Threatened Ecological Community assessments are shown in Figure A.1. Patches assessed are shown in Figure A.4. Qualification of the Threatened Ecological Community was undertaken against the assessment criteria provided or taken from the above-mentioned guidelines, as detailed below in Table 2.3.

 Table 2.3
 Assessment criteria for Grey Box Grassy Woodland and derived native grasslands of South-eastern

 Australia
 Australia

SCIENTIFIC DETERMINATION CRITERIA

Key Diagnostic Characteristics

The tree canopy is dominated (\geq 50% canopy crown cover) by *Eucalyptus microcarpa* (Grey Box). Other tree species may be present in the canopy and, in certain circumstances, may be co-dominant with Grey Box but are never dominant on their own. These associated species are listed in Appendix A.

SCIENTIFIC DETERMINATION CRITERIA

The mid layer comprises shrubs of variable composition and cover, from absent to moderately dense. The mid layer usually has a crown cover of less than 30% with local patches up to 40% crown cover.

The mid layer comprises shrubs of variable composition and cover, from absent to moderately dense. The mid layer usually has a crown cover of less than 30% with local patches up to 40% crown cover.

The ground layer also is highly variable in development and composition, ranging from almost absent to mostly grassy to forb-rich. Ground layer flora commonly present include one or more of the graminoid genera: *Rytidosperma*, *Austrostipa*, *Elymus*, *Enteropogon*, *Dianella* and *Lomandra*; and one or more of the chenopod genera: *Atriplex*, *Chenopodium*, *Einadia*, *Enchylaena*, *Maireana*, *Salsola* and *Sclerolaena*.

Derived grasslands are a special state of the ecological community, whereby the canopy and mid layers have been mostly removed to <10% crown cover but the native ground layer remains largely intact, with 50% or more of the total vegetation cover being native.

Condition Thresholds

1a. The minimum patch size is 0.5 hectare; AND

1b. The canopy layer contains Grey Box (E. microcarpa) as the dominant or co-dominant tree species; AND

1c. The vegetative cover of non-grass weed species in the ground layer is less than 30% at any time of the year.

2a. At least 50% of the vegetative cover in the ground layer comprises perennial native species at any time of the year; AND

2b. 8 or more perennial native species are present in the mid and ground layers at any time of the year.

Additional criteria that apply to smaller woodland patches (0.5 to <2ha in area) with tree crown cover >10%

2a. At least 50% of the vegetative cover in the ground layer comprises perennial native species at any time of the year; AND

2b. 8 or more perennial native species are present in the mid and ground layers at any time of the year.

Additional criteria that apply to larger woodland patches with a well-developed canopy (2 ha or more in area)

3a. At least 8 trees/ha are hollow bearing or have a diameter at breast height of 60 cm or more; AND

3b. at least 10% of the vegetative ground cover comprises perennial native grasses at any time of the year; OR

4a. At least 20 trees/ha have a diameter at breast height of 12 cm or more; AND

4b. at least 50% of the vegetative cover in the ground layer comprises perennial native species.

<u>Additional criteria</u> that apply to patches where the canopy is less developed or absent (derived grassland) (≥ 0.5 ha in area)

5a. Woodland density does not meet criteria 3a or 4a, or is a derived grassland with clear evidence that the site formerly was a woodland with a tree canopy dominated or co-dominated by *E. microcarpa*; AND

5b. At least 50% of the vegetative cover in the ground layer is made up of perennial native species at any time of the year; AND

5c. 12 or more native species are present in the ground layer at any time of the year.

2.4.3 Swift Parrot habitat assessment

Swift Parrot is listed as Critically Endangered under both the EPBC Act and FFG Act. Habitat for this species was previously assessed as being the entire project area (i.e. ~37.4 ha) (Eco Logical Australia, 2023c).

In order to determine a more accurate area of impact, WSP ecologists assessed potential Swift Parrot habitat by identifying the canopy cover of key foraging tree species. This approach was adopted because it excludes habitat resources not primarily utilised by this species on mainland Australia, such as bare ground, grassy understorey and non-preferred canopy species. Key tree species that provide important nesting and foraging habitat for Swift Parrots are identified in the *National Recovery Plan for the Swift Parrot* (Saunders and Tzaros, 2011). Those which occur in the project area include:

- Yellow Gum Eucalyptus leucoxylon subsp. leucoxylon (low numbers)
- Grey Box Eucalyptus microcarpa
- Yellow Box Eucalyptus melliodora
- White Box *Eucalyptus albens* (low numbers).

Eucalypt species composition was established by sampling, completed on 19 October and 28-29 November 2023 (refer to Table 2.4). This involved point intersects every 10 m along seven transects that spanned the width of the proposed quarry site, located approximately 150 m apart and evenly spaced (refer to Figure A.2). At each point intersect, tree canopy cover of Swift Parrot key tree species was recorded as either present (denoted by a 1) or absent (denoted by a 0). Canopy point intersects were completed using a vertical viewing scope with cross-hair.

2.4.4 Summary of site assessments and targeted survey effort

SURVEY & ASSESSMENT	SURVEY DETAILS	DATE	PERSONNEL	REFERENCE
Native Vegetation Assessment – Quarry site	Vegetation Quality Assessment (VQA)	28 November 2023 29 November 2023	Mark Shepherd Justin Pegg	Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual – guidelines for applying the habitat hectares scoring method version 1.3 (DSE, 2004).
Clover Glycine targeted surveys	Linear transects across potential habitat	 September 2023 October 2023 November 2023 November 2023 	Justin Pegg Justin Pegg & Emi Arnold Mark Shepherd, Imogen Merlo & Emi Arnold Mark Shepherd	SPRAT profile for Glycine latrobeana - Clover Glycine, Purple Clover [Online] (DCCEEW, 2024c)
Threatened Ecological Community	Floristics – coverage and diversity quadrats 1m x 1m	29 November 2023	Mark Shepherd Justin Pegg	Grey Box Grassy Woodlands and Derived Native Grasslands of South Eastern Australia: A guide to the identification, assessment and management of a nationally threatened ecological community (DSEWPaC, 2012) Commonwealth Listing Advice on Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (TSSC, 2010)

Table 2.4 Summary of site assessments and targeted survey effort

SURVEY & ASSESSMENT	SURVEY DETAILS	DATE	PERSONNEL	REFERENCE
Swift Parrot targeted surveys	Habitat assessment	19 October 2023 28-29 November 2023	Imogen Merlo Imogen Merlo & Emi Arnold	<i>National Recovery Plan for the Swift Parrot</i> (Saunders and Tzaros, 2011).
Native Vegetation Assessment – Haul road alignment	Collect tree data along Stones Road	5-7 August 2024	Justin Pegg, Nic McCaffrey, Emi Arnold & Angus Houston	<i>Guidelines for the removal, destruction or lopping of native vegetation (2017)</i> (the Guidelines) (DELWP, 2017c).

2.5 IMPACT ASSESSMENT

An evaluation of implications of relevant biodiversity policy, legislation and triggers for permits was undertaken. The impacts were assessed against the following key biodiversity-relevant legislation and policies, including:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Environmental Effects Act 1978 (EE Act)
- Flora and Fauna Guarantee Act 1988 (FFG Act)
- Planning and Environment Act 1987 (P&E Act) in relation to the Mount Alexander Planning Scheme
 - Clause 52.17- Guidelines for the removal, destruction or lopping of native vegetation (Guidelines)
- Catchment and Land Protection Act 1994 (CaLP Act)
- Wildlife Act 1975.

In addition, Significant Impact Assessments (SIAs) were undertaken by WSP for six EPBC Act Matters of National Environmental Significance (MNES) against the most appropriate assessment guidelines, including the *Significant Impact Guidelines 1.1* (Department of the Environment, 2013). This was to ensure enough detail was provided to support an Environmental Effects Statement (EES) referral and EPBC Act assessment, if required.

2.6 PERMITS

All WSP staff are covered under and operate in accordance with the Department of Energy, Environment and Climate Action (DEECA) Wildlife and Small Institutions Animal Ethics Committee approval (16.23) and Victorian Wildlife Act 1975 Authorisation (10010999). Additionally, all relevant WSP staff are covered under the Victorian Flora and Fauna Guarantee Act 1988 Permit to Take Protected Flora (10010998).

2.7 TERMINOLOGY/NOMENCLATURE

Flora and Fauna taxonomy nomenclature in this report follows the VBA (DEECA, 2024d). Plant and animal species in this report are initially cited by both common and scientific name, with scientific name in *italics*. Subsequent references to a species cite the common name only. Introduced species are identified within text with an asterisk '*' mark, for example **Briza maxima*.

2.8 LIMITATIONS

A common limitation of ecological surveys is the short time period over which they are undertaken and a lack of seasonal sampling, which can lead to lack of detection of some species. Site conditions, including the presence of threatened

species and extent of threatened communities, can change with time, and the results of a survey, including the presence or otherwise of species, are indicative of the environmental conditions at the time of assessment.

Verification of works by previous consultants has been undertaken to a reasonable degree, and commensurate with time spent undertaking verification.

This assessment is assumed to satisfy regulator requirements at this stage of assessment. It is possible that regulators may require further assessment, for example if referrals under the EPBC Act and EES Act are undertaken.

A legal limitation statement is provided in Appendix G.

3 Results

3.1 DESKTOP ASSESSMENT

3.1.1 *Literature review*

Several previous ecological and impact assessment reports have been prepared by various consultants. A summary of the findings of these reports are presented below:

3.1.1.1 Ecological Assessment of Threatened Species Presence at the proposed Blue Hills Quarry (Habitat Management Services, 2021)

Several threatened species surveys were conducted across the entire Mawson property and along adjoining roads to determine species presence/absence at the proposed Blue Hills quarry site. A summary of the threatened species surveys conducted between July and August 2021, and the findings, are provided in Table 3.1.

TARGET SPECIES	STATUS	SURVEY METHOD	RESULT	DISCUSSION
Spiny Rice Flower Pimelea spinescens subsp. spinescens	CR cr	Point and transect surveys	Not recorded.	Unlikely habitat for this species.
Swift Parrot <i>Lathamus discolor</i>	CR, Mr, cr	Point, transect and call-playback surveys	One potentially heard calling during call-playback surveys. Potential opportunistic sighting of two individuals east of the proposed quarry.	Grey Box and Ironbark trees within the Blue Hills site were not flowering at the time of surveys. Due to the uncertain observation, Habitat Management Services recommends that the Precautionary Principle is followed and that Swift Parrot is known to occur on site and throughout the surrounding area.
Reagent Honeyeater Anthochaera phrygia	CR, cr	Point, Transect and Call-playback surveys	Not recorded.	Preferred tree food sources were not flowering at the time of surveys. The Precautionary Principle should be followed, and it should be assumed that the Regent Honeyeater has the potential to occur on site.
Brush-tailed Phascogale Phascogale tapoatafa	vu	Camera traps and spotlight surveys	Recorded on camera traps and when undertaking spotlight surveys.	Some records from within the proposed quarry site area.
Victorian Temperate Woodland Bird Community (VTWBC)	FFG Listed	Point, transect, call-playback and spotlight surveys	Recorded 13 out of the 24 species that make up this community. Of these, there is potential uncertainty about the Swift Parrot (see above) and the Barking Owl <i>Ninox</i> <i>connivens</i> .	For the Barking Owl, the precautionary principle must be followed, and it must be assumed that this species was observed on site.

Table 3.1 Targeted species surveys and competed by Habitat Management Services in 2021

Overall, ten species listed under the FFG Act were recorded during surveys. This included one flora species, Bluebeard Orchid *Pheladenia deformis* (non-threatened), and nine fauna species including Swift Parrot (assumed present), Turquoise Parrot *Neophema pulchella*, Speckled Warbler *Pyrrholaemus sagittatus*, Hooded Robin *Melanodryas cucullata*, Grey-crowned Babbler *Pomatostomus temporalis*, Diamond Firetail *Stagonopleura guttata*, Barking Owl *Ninox connivens* (assumed present), Little Eagle *Hieraaetus morphnoides* and Brush-tailed Phascogale *Phascogale tapoatafa*. It is worth noting that since this assessment, Hooded Robin has been listed as Endangered under the EPBC Act as *Melanodryas cucullata cucullate*, effective March 2023.

Ecological values supported by the study area were also identified as aligning with the description of one FFG Act listed ecological community, Victorian Temperate Woodland Bird Community (VTWBC).

The assessment concluded that the position of the quarry is likely to cause some level of impact to a number of threatened species and their habitat. Habitat Management Services recommended that additional surveys are conducted due to the lack of flowering trees and mistletoe within the Blue Hills site during the July-August 2021 surveys.

3.1.1.2 Blue Hills Quarry – Stage 2 Ecological Assessment V4 (Eco Logical Australia, 2023a)

Study area

The study area for this assessment was the proposed quarry boundary plus an additional 100 m buffer, covering an area of approximately 74 ha in total. Surveys for this assessment were undertaken by Eco Logical Australia throughout 2021 and 2022. This report is supplementary to the Stage 1 surveys and assessment completed by Habitat Management Services (Section 3.1.1.1).

Native vegetation

General vegetation and habitat assessments were undertaken on 5 and 8 November 2021. Vegetation within the study area forms part of a larger contiguous patch of bushland. The majority of the study area (approx. 64 ha inclusive of the 100 m buffer) has vegetation attributable to Hillcrest Herb-rich Woodland (EVC 70). It supports a Grey Box *Eucalyptus microcarpa* dominate canopy and a high-quality herb rich ground cover with a high floristic diversity including orchids and herbs. Yellow Box *Eucalyptus melliodora* was recorded to the far east of the Hillcrest Herb-rich Woodland patch.

The western end of the study area is flatter and was found to support approximately 10 ha of Plains Woodland (EVC 803). There is significant variation in ground cover quality between the northern and southern sections of the patch. The northern half (approx. 5 ha) supports a diverse but sparse grassy understory and is in poorer condition, likely due to sheep grazing from a neighbouring property. In contrast, the southern half (approximately 5 ha) has a relatively dense, and more diverse grassy understory, and qualifies as the nationally listed Threatened Ecological Community *Grey Box Eucalyptus macrocarpa Grassy Woodlands and Derived Native Grasslands of South-eastern Australia*.

There are approximately 140-210 large trees within the study area.

Significant flora and fauna surveys

All desktop searches were undertaken, centred on the study area and covering a 10 km buffer. A total of nine significant flora species and 24 fauna species were determined as being present or having a medium to high likelihood of occurrence. Based on this, the following targeted flora and fauna surveys were undertaken.

SURVEY	TARGET SPECIES	SURVEY DETAILS	DATE	RESULT
Threatened Flora	 McIvor Spider Orchid Caladenia audasii River Swamp Wallaby- grass Amphibromus fluitans 	Identified optimal and micro-habitat during initial habitat surveys using 'random meander'. Systematic search using parallel transects approx. 5-20 m apart and additional perpendicular transects where a target species was identified.	15-16 December 2021 Additional surveys for McIvor Spider Orchid and Clover Glycine undertaken on 26-28 October 2022.	Not recorded.

Table 3.2 Targeted species surveys competed by Eco Logical Australia for the Quarry Stage 2 Assessment

SURVEY	TARGET SPECIES	SURVEY DETAILS	DATE	RESULT
	 Trailing Hop Bush Dodonaea procumbens Clover Glycine Glycine latrobeana 			
Reptile Survey	Pink-tailed Worm Lizard Aprasia parapulchella	Visual inspection of habitat via rock rolling/turning within transects approximately 10 m wide. Approx 12,000- 15,000 rocks were turned in total over an area of 6.15 ha.	2 December 2021 15-16 December 2021	Not recorded.
	Striped-legless Lizard <i>Delma</i> impar	100 tiles were micro-sited and deployed in areas of suitable habitat. Tiles were arranged in two transects of 50 tiles with approximately 5 m between each tile.	<u>Tiles deployed</u> July 2022 <u>Tiles checked</u> 19 October 2022 -31 March 2023	Not recorded.
Bird Surveys	Barking Owl Ninox connivens	Call Play-back and spotlighting at five locations.	1 December 2021 15 December 2021	Not recorded.
	All birds with a focus on FFG listed species in the Victorian Temperate Woodland Bird Community (VTWBC)	Visual and auditory surveys undertaken using the 2-ha x 20-minute sampling method whereby each 2-ha area comprised a single transect. Surveys were undertaken on five days during	1-3 December 2021 15-16 December 2021	11 VTWBC species were recorded.
		mornings and nights along 26 transects.		
		Songmeter TM – two located in the study area and two located in nearby connected bushland.	16-21 December 2021	The most bird diversity was recorded at the dam.

The study area was found to provide good quality habitat for fauna. The dam within the study area consistently recorded the most bird diversity on the SongmeterTM and was observed as an important source of water, providing drinking water for fauna, especially birds, and habitat for common frogs. Large Grey Box *Eucalyptus macrocarpa* trees contained hollows of varying sizes which provide nesting opportunities for hollow-dependant fauna. Grey Box also provide an important food source for nectivorous and insectivorous species as well as roosting and nesting habitat for birds. The surface rock across the study area provides shelter, foraging and basking opportunities for reptiles, while the ground layer vegetation provides good-quality habitat for ground-dwelling mammals.

Three significant flora species were recorded during targeted flora surveys (Table 3.3). Note that all recorded individuals were located within the Hillcrest Herb-rich Woodland patch of native vegetation. No EPBC Act listed flora species were recorded.

	Table 3.3	Significant flora	species recorded	within the proposed	quarry study area
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COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS	NUMBER OF INDIVIDUALS RECORDED
Buloke	Allocasuarina luehmannii	cr	2
Golden Cowslips	Diuris behrii	en	2
Small-flower Wallaby-grass	Rytidosperma monticola	en	111 during targeted surveys
			130 observed opportunistically

At the time of the assessment, seven significant fauna species were recorded³ (refer to Table 3.4). No Barking Owls, Pink-tailed Worm Lizards *Aprasia parapulchella* or Striped Legless Lizards *Delma impar* were recorded during targeted surveys undertaken for this assessment. The likelihood of occurrence for Pink-tailed Worm Lizard and Striped Legless Lizard occurring within the study area were revaluated post surveys, and downgraded to low. Survey conditions on the first night of Barking Owl surveys may have influenced the lack of detection of the species during this assessment. Habitat Management Services reported probable detection of Barking Owl within their broader study area in 2021 (Habitat Management Services, 2021). Eco Logical Australia agreed with the precautionary 'confirmed presence' approach adopted by Habitat Management Services for this species.

Furthermore, the study area supports the FFG Act listed Victorian Temperate Woodland Bird Community (VTWBC) with 11 out of the 24 species that comprise that community recorded during assessments and surveys (refer to Table 3.4).

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS	NUMBER OF INDIVIDUALS RECORDED
Black-chinned Honeyeater*	Melithreptus gularis		Recorded
Black-eared Cuckoo*	Chrysococcyx osculans	Mr	1 during targeted surveys 1 observed opportunistically
Brown-headed Honeyeater*	Melithreptus brevirostris		Recorded
Diamond Firetail*	Stagonopleura guttata	VU, vu	4 during targeted bird surveys 1 record on the Songmeter TM
Fuscous Honeyeater*	Lichenostomus fuscus		Recorded
Hooded Robin*	Melanodryas cucullata	EN as Melanodryas cucullata cucullate, vu	7 during targeted surveys
Jacky Winter*	Microeca fascinans		Recorded
Lace Monitor	Varanus varius	en	6 observed opportunistically
Painted Button-quail*	Turnix varius		Recorded
Rainbow Bee-eater	Merops ornatus	Mr	1 observed opportunistically within the 100 m buffer
Red-capped Robin*	Petroica goodenovii		Recorded
Speckled Warbler*	Pyrrholaemus sagittatus	en	3 during targeted surveys5 observed opportunistically
Square-tailed Kite	Lophoictinia isura	vu	1 observed opportunistically flying east of the study area

Table 3.4 Significant fauna species recorded within the proposed quarry study area

Table legend

<u>EPBC Act:</u> EN = Endangered, VU = Vulnerable, Mr = Marine

FFG Act: en = endangered, vu = vulnerable, * Victorian Temperate Woodland Bird Community Species

³ Note that Brown Treecreeper Climacteris picumnus was recorded during this assessment, but was not yet listed under the EPBC Act at the time. Therefore, the species was only included in the species list of the report and not considered further for impacts.

3.1.1.3 Blue Hills Quarry Haul Road Ecological Assessment V2 (Eco Logical Australia, 2023b)

Study area

Surveys for this assessment were undertaken by Eco Logical in 2022 and early 2023. While the report assessed all nine alignment options, it focused on the preferred haul road alignment at the time (i.e. option 8) which begins on the western side of the proposed quarry site, and traverses west through farmland for 2.4 km. The route then turns south for approximately 380 m, and then south-west for 1.2 km, running parallel to a creek line, until it meets Bridgewater-Maldon Road. This assessment also surveyed an additional area along Bridgewater-Maldon Road and Stones Road to allow for potential road widening if required.

Native vegetation

General vegetation and habitat assessments were conducted on 12-13 July 2022. The majority of the study area was found to consist of farmland, ploughed paddocks and degraded roadsides. Two small patches of Plains Woodland (EVC 803) were mapped where the study area meets Bridgewater-Maldon Road (totalling 0.16 ha). A third patch of Plains Woodland was identified in the east where the study area meets the proposed quarry footprint. However this vegetation is part of a larger patch mapped by Eco Logical Australia for the *Blue Hills Quarry - Stage 2 Ecological Assessment* (Eco Logical Australia, 2023a) and was not included in this assessment.

Another patch of Plains Woodand was identified within the additional survey area on Bridgewater-Maldon Road. Vegetation communities and Threatened Ecological Community surveys were conducted on 12-13 July 2022 and determined that this patch qualified as the EPBC listed *Grey Box Eucalyptus microcarpa Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.* This patch is contiguous (based on canopy cover) with the patch of Plains Woodland within the haul road study area. However, there was a significant difference in the quality of the understory between the two patches. Therefore, the assessment determined that the patch of Plains Woodland within the study area did not qualify as the EPBC Act listed Threatened Ecological Community.

Significant flora and fauna species

All database searches were undertaken on an investigation area centred on the study area and covering a 10 km buffer. A total of five significant flora species and 17 fauna species were determined as having a medium to high likelihood of occurrence based on a desktop review. The following targeted fauna surveys were subsequently undertaken.

SURVEY	TARGET SPECIES	SURVEY DETAILS	DATE	RESULT
Bird Surveys	All birds with a focus on Swift Parrot <i>Lathamus discolor</i> and FFG listed species in the Victorian Temperate Woodland Bird Community	Visual and auditory surveys undertaken using the 5-minute point survey method during morning and afternoons (12 hours total) at 16 sites in accordance with the Bird Life Australia Swift Parrot guide.	12-13 July 2022	Swift Parrot not recorded. One VTWBC species, Jacky Winter, recorded.
Reptile Survey	Striped Legless Lizard <i>Delma</i> impar	90 tiles were micro-sited and deployed in areas of suitable habitat. Tiles were arranged in four transects with approximately five metres between each tile.	<u>Tiles deployed</u> July 2022 <u>Tiles checked</u> 19 October 2022 - 31 March 2023	Not recorded.
Arboreal Mammal Surveys	Brush-tailed Phascogale Phascogale tapoatafa	Six baited remote motion sensor cameras were deployed in areas of suitable habitat along the proposed haul road alignment.	13 July 2022 - 9 November 2022	Not recorded.

Table 3.5	Targeted species su	rvevs competed by ELA	for the Haul Road Ecological	Assessment
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No significant flora species were recorded within the preferred haul road study area due to the limited availability of suitable habitat. Similarly, no significant fauna species were recorded during targeted surveys undertaken for Swift Parrot, Striped Legless Lizard and Brush-tailed Phascogale. Survey conditions and effort were deemed sufficient by Eco Logical Australia to satisfy a low likelihood of occurrence for each species within the haul road study area.

The quarry area was identified as supporting the FFG Act listed Victorian Temperate Woodland Bird Community (VTWBC). One of the 24 species listed under this community, Jacky Winter *Microeca fascinans*, was recorded within the study area.

3.1.1.4 Blue Hills Quarry Impact Assessment V4 (Eco Logical Australia, 2023c)

Study area

The study area for this assessment consisted of the quarry, the preferred haul road alignment at the time (option 8) and the eight other alternative haul road options. Surveys for this assessment were undertaken by Eco Logical Australia in 2023. This report drew on the information presented in previous assessments to determine the likely impact of the project on ecological values present at the site.

Native vegetation

Detailed vegetation assessments of the study area were undertaken by Eco Logical Australia between 3-5 May 2023. The assessment identified one patch of Hillcrest Herb-rich Woodland (EVC 70) and one patch of Plains Woodland (EVC 803) across the quarry site, totalling 36.26 ha. A small section (0.42 ha) of the patch of Plains Woodland extends into the preferred haul road alignment. In addition, three other patches of Plains Woodland (EVC 803) were mapped within the alignment, equating to a total area of 0.71 ha across the haul road (Table 3.6).

The study area was also found to support 2.4 ha of EPBC Act listed *Grey Box Eucalyptus macrocarpa Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* within the proposed quarry area. Another patch of this Threatened Ecological Community was mapped within an alternative haul road area, along Bridgewater-Maldon Road. The study area also supports FFG Act listed Victorian Temperate Woodland Bird Community (VTWBC).

LOCATION	ENSYM ID	EVC	VQA SCORE	AREA (HA)
Quarry	1A	Hillcrest Herb-rich Woodland (EVC 70)	0.83	34.26
Quarry & Preferred haul road (option 8)	1B	Plains Woodland (EVC 803)	0.63	2.00 Quarry 0.42 Haul Road
Preferred haul road	2A	Plains Woodland (EVC 803)	0.56	0.04
(option 8)	3A	Plains Woodland (EVC 803)	0.56	0.13
	4A	Plains Woodland (EVC 803)	0.56	0.12
Total				36.97 ha

Table 3.6 Patches within the quarry area and preferred haul road

A total of 74 large trees were recorded within the quarry area and the preferred haul road alignment (option 8). Large trees were defined as those with a Diameter at Breast Height (DBH) \geq 70 cm.

 Table 3.7
 Trees recorded within the quarry area and preferred haul road

LOCATION	ТҮРЕ	SIZE	SPECIES	COUNT
Quarry	Patch	Large	Grey Box Eucalyptus microcarpa	67
Haul Road (option 8)	Scattered	Large	Grey Box Eucalyptus microcarpa	1
	Patch	Large	Grey Box Eucalyptus microcarpa	6

Significant flora and fauna species

All database searches were undertaken on an investigation area centred on the study area and covering a 10 km buffer. A total of eight significant flora species and 22 fauna species were determined as present or having a medium to high likelihood of occurrence within the study area.

No additional targeted surveys were undertaken as part of this impact assessment. However, Late-flower Flax-lily *Dianella tarda* was recorded opportunistically during VQA assessments along Bridgewater-Maldon Road. Combined with the results of previous assessments undertaken by Habitat Management Services (Habitat Management Services, 2021) and Eco Logical Australia (Eco Logical Australia, 2023a, Eco Logical Australia, 2023b) a total of four threatened flora species and ten threatened fauna species were recorded within the study area (refer to Section 3.2.2). This includes 11 Swift Parrots that were opportunistically recorded south and east of the quarry boundary. Flora species or genera protected under the FFG Act were also recorded.

Based on the presence of suitable habitat within the project area and the results of previous assessments, an additional four flora species and 12 fauna species were considered likely to occur. Of these, seven are listed under the EPBC Act including: Clover Glycine, Southern Shepherd's Purse *Ballantinia antipoda*, Fork-tailed Swift *Apus pacificus*, Bluewinged Parrot *Neophema chrysostoma*, Cattle Egret *Bubulcus ibis*, Painted Honeyeater *Grantiella picta* and White-throated Needletail *Hirundapus caudacutus* (refer to Section 3.2.2).

Groundwater dependant ecosystems

A Groundwater Dependant Ecosystem (GDE) is defined as plant and animal communities that require a groundwater source to supply their water requirement for at least part of the time. A GDE assessment was undertaken to further investigate potential impacts to GDEs as a result of the project. It determined that the proposed quarry site is both coincident and adjacent to high potential terrestrial and aquatic GDEs. Detailed assessments indicated that excavation associated with the proposed quarry site may result in local groundwater drawdown up to 100 m locally, potentially having some level of impact on local GDEs. Additional observation of the groundwater table and numerical groundwater modelling may be required to determine the extent of potential impacts.

Potential impacts

The proposed works will result in the following impacts to significant ecological values:

- The removal of 34.26 ha of Hillcrest Herb-rich Woodland (EVC 70), including 61 large canopy trees
- The removal of 2.71 ha of Plains Woodland (EVC 803), including 12 large canopy trees
- The removal of one large, scattered tree (0.07 ha)
- The removal of 36.68 ha of FFG Act listed Victorian Temperate Woodland Bird Community (VTWBC).
- The removal of 2.4 ha of, and potential to significantly impact, the endangered EPBC Act listed Grey Box Eucalyptus macrocarpa Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (GBGW).
- The potential to significantly impact the following EPBC Act listed species:
 - Five EPBC Act threatened fauna species: Brown Treecreeper Climacteris picumnus, Swift Parrot Lathamus discolor, Hooded Robin Melanodryas cucullate, Diamond Firetail Stagonopleura guttata, Blue-winged Parrot Neophema chrysostoma
 - One EPBC Act listed marine species: Black-eared Cuckoo Chalcites osculans
 - One EPBC Act threatened flora species: Clover Glycine Glycine latrobeana
- The potential to impact five FFG Act listed flora species: Golden Cowslips *Diuris behrii*, Clover Glycine, Smallflower Wallaby-grass *Rytidosperma monticola*, Crimson Sun-orchid *Thelymitra X macmillanii* and Southern Swainson-pea *Swainsona behriana*.

- The potential to impact thirteen FFG Act listed fauna species: Little Eagle *Hieraaetus morphnoides*, Swift Parrot, Square-tailed Kite *Lophoictinia isura*, Hooded Robin, Turquoise Parrot *Neophema pulchella*, Barking Owl *Ninox connivens*, Crested Bellbird *Oreoica gutturalis*, Brush-tailed Phascogale *Phascogale tapoatafa*, Bearded Dragon *Pogona barbata*, Grey-crowned Babbler *Pomatostomus temporalis*, Speckled Warbler *Pyrrholaemus sagittatus*, Diamond Firetail and Lace Monitor *Varanus varius*.
- 3.1.1.5 Mawsons Blue Hills Quarry Nest Box & Habitat Hollows Installation Report (Habitat Management Services, 2023)

In July 2023, nest boxes and habitat hollows were installed in trees adjacent to the proposed Blue Hills Quarry site. The aim of the installation was to provide additional habitat in trees that are to be retained for native species of bird and mammal that habituate within the site.

A total of 50 habitat types were installed on suitable trees comprising 22 nest boxes, 26 carved hollows and two hollow logs. Trees deemed suitable for installation were selected based on a set of criteria including, but not limited to, tree height, canopy, species, neighbouring habitat and proximity to food and water sources. Nest boxes and hollows were constructed and installed to accommodate a range of common and significant fauna species including parrots and other hollow nesting birds, microbats, gliders, possums and Brush-tailed Phascogale.

The location of each nest box/habitat hollow was GPS mapped and data pertaining to each was recorded. Five solarpowered monitoring cameras were also installed to capture images and video footage for a duration of six months from installation. It is also recommended that internal checks via a pole inspection camera and/or climber occur during the spring and summer months. The data recorded from monitoring will help determine whether fauna is utilising the habitat that has been installed.

3.1.2 WSP VBA and PMST queries

The VBA and PMST were queried on 28 February 2024 to provide an up-to date list of species of state and/or national conservation significance that are modelled to occur and/or have been recorded within a 10 km radius of the project area. Consideration of significant species returned by database searches was done with reference to the habitat values within the project area, species habitat requirements and historic records and findings from previous assessments. The results are summarised below, and the full likelihood of occurrence assessment is provided in Appendix B.

3.1.2.1 Flora

Desktop searches retuned a total of 36 significant flora species recorded, or predicted to occur, within a 10 km radius of the project area. Of these, 24 species are listed under the EPBC Act and 31 are listed under the FFG Act. Note that one species, Golden Cowslips *Diuris behrii*, was not returned in the most recent database searches. However, it was included in the likelihood assessments due to being previously recorded within the project area by Eco Logical Australia (Eco Logical Australia, 2023a).

3.1.2.2 Fauna

VBA and PMST searches retuned a total of 68 significant fauna species recorded, or predicted to occur, within 10 kms of the project area. Of these, 44 species are listed under the EPBC Act comprising 34 species with a threatened conservation status, 11 species listed as Migratory, and 18 species listed as Marine. Of the 68 species, 55 are listed under the FFG Act. Note that one species, Turquoise Parrot *Neophema pulchella*, was not returned in the most recent database searches however it was included in the likelihood assessments due to being previously recorded within the project area by Habitat Management Services (Habitat Management Services, 2021).

3.2 SITE ASSESSMENT RESULTS

3.2.1 WSP flora & fauna records

A total of 79 vascular plant species were recorded across the project area by WSP ecologists during site assessments conducted throughout 2023. This included 65 indigenous species (82%) 13 introduced species (17%) and one non-indigenous native (1%). Of these, three species are listed under the FFG Act:

- Buloke Allocasuarina luehmannii, FFG Act critically endangered
- Glaucous Flax-lily Dianella longifolia var. grandis, FFG Act critically endangered
- Small-flower Wallaby-grass *Rytidosperma monticola*, FFG Act endangered.

In addition, 16 flora species declared as Protected Flora under the FFG Act were recorded within the project area during the WSP site assessment. Refer to Appendix C for a full list of recorded flora species.

A total of 19 fauna species were also recorded within the project area comprising 17 birds and two mammals (Appendix C). Of these, one bird, Rainbow Bee-eater *Merops ornatus*, is listed as Marine under the EPBC Act and one bird, Jacky Winter *Microeca fascinans*, is part of the FFG Act listed Victorian Temperate Woodland Bird Community (VTWBC) (refer to Section 3.2.6.2).

3.2.2 Likelihood of occurrence

Following detailed site assessments undertaken by WSP ecologists, and revision of previous assessments, WSP concurs with the likelihood of occurrence conclusions presented in the Blue Hills Quarry Impact Assessment (V4) report for the following flora and fauna species detailed in Table 3.8 and Table 3.9, respectively. These species were either recorded or determined to have a moderate or higher likelihood of occurrence within the project area.

As part of the revised likelihood of occurrence assessment, additional species recorded or considered likely to occur by WSP, but not by Eco Logical Australia, are included in these tables (denoted by a ^).

3.2.2.1 Significant flora species

Five significant flora species listed under the FFG Act were recorded by Eco Logical Australia and/or WSP within the project area. Note that one of these species, Late-flower Flax-lily *Dianella tarda*, was originally recorded by Eco Logical Australia along Bridgewater-Maldon Road, Stones Road and Murphey's Road (Eco Logical Australia, 2023c). At the time, these records were located in close proximity to, but outside of, the proposed project area. However, the haul road alignment has since been updated meaning that two Late-flower Flax-lily records located near Stones Road are now situated within the current project area footprint (refer to Figure A.3).

Additionally, one flora species Southern Swainson-pea *Swainsona behriana* is considered to have a moderate likelihood of occurrence based on suitable potential habitat present within the project area.

COMMON NAME	SCIENTIFIC NAME	STATUS	LIKELIHOOD OF OCCURRENCE	RECORDED BY
Buloke	Allocasuarina luehmannii	cr	Recorded - Two saplings were recorded by WSP ecologists within the north-west corner of the proposed quarry site. Previous assessments undertaken by Eco Logical Australia also recorded two Bulokes.	ELA (2023a) WSP (2023)
Glaucous Flax-lily [^]	Dianella longifolia var. grandis	cr	Recorded – Two occurrences of Glaucous Flax-lily located within the quarry area.	WSP (2023)

 Table 3.8
 Significant flora species present or with a moderate or higher likelihood of occurrence

COMMON NAME	SCIENTIFIC NAME	STATUS	LIKELIHOOD OF OCCURRENCE	RECORDED BY
Golden Cowslips	Diuris behrii	en	Recorded – Two fruiting bodies were observed during the preliminary survey which appeared to be from this species (Eco Logical Australia, 2023a). WSP ecologists recorded approximately 40 Cowslips <i>Diuris chryseopsis</i> , although no Golden Cowlsips <i>Diuris behrii</i> were recorded within the proposed quarry footprint.	ELA (2023a)
Late-flower Flax-lily	Dianella tarda	cr	Recorded – A total of 24 individuals were recorded during previous assessments, located predominately within native vegetation along Stones Road and Bridgewater-Maldon. Two individuals occur within the haul road alignment (along Stones Road), while several others are located in close proximity.	ELA (2023c)
Small-flower Wallaby-grass	Rytidosperma monticola	en	Recorded - High number of individuals recorded at the proposed quarry site by WSP ecologists and during previous assessments.	ELA (2023a) WSP (2023)
Southern Swainson- pea	Swainsona behriana	en	Moderate - parts of the project area could provide suitable habitat for this species.	-

<u>Table legend</u>

FFG Act: cr = critically endangered, en = endangered

[^]Not considered likely to occur or recorded by previous consultants

3.2.2.2 Significant fauna species

Following detailed desktop assessment and verification of previous assessments, a total of 23 significant fauna species have either been recorded or are considered to have a moderate or high likelihood of occurrence within the project area. The breakdown is as follows:

- Eight species were given a moderate likelihood of occurrence based on suitable habitat within the project area. These species included: Bearded Dragon *Pogona barbata*, Black Falcon *Falco subniger*, Blue-winged Parrot *Neophema chrysostoma*, Cattle Egret *Bubulcus ibis*, Crested Bellbird *Oreoica gutturalis*, Fork-tailed Swift *Apus pacificus*, Painted Honeyeater *Grantiella picta* and White-throated Needletail *Hirundapus caudacutus*.
- Five species were given a high likelihood of occurrence based on previous records in the area and site suitability: Barking Owl *Ninox connivens*, Grey-crowned Babbler *Pomatostomus temporalis*, Little Eagle *Hieraaetus morphnoides*, Southern Whiteface *Aphelocephala leucopsis* and Turquoise Parrot *Neophema pulchella*.
- Ten significant fauna species were recorded within the project area by WSP and/or during previous ecological assessments (Habitat Management Services, 2021, Eco Logical Australia, 2023a, Eco Logical Australia, 2023c). These species include Black-eared Cuckoo *Chalcites osculans*, Brown Treecreeper (south-eastern) *Climacteris picumnus (victoriae)*, Brush-tailed Phascogale *Phascogale tapoatafa*, Diamond Firetail *Stagonopleura guttata*, Hooded Robin *Melanodryas cucullate*, Lace Monitor *Varanus varius*, Rainbow Bee-eater *Merops ornatus*, Speckled Warbler *Pyrrholaemus sagittatus*, Square-tailed Kite *Lophoictinia isura* and Swift Parrot *Lathamus discolor*.
Table 3.9
 Significant fauna species present or with a moderate or higher likelihood of occurrence

COMMON NAME	SCIENTIFIC NAME	STATUS	LIKELIHOOD OF OCCURRENCE	RECORDED BY
Barking Owl	Ninox connivens	cr	High - precautionary principle applied and species considered present by HMS 2021.	HMS (2021)
Bearded Dragon	Pogona barbata	vu	Moderate - the project area has suitable foraging habitat possibly utilised by this species.	-
Black-eared Cuckoo	Chalcites osculans	Mr	Recorded - species previously recorded during assessments.	ELA (2023a)
Black Falcon	Falco subniger	cr	Moderate - the project area has suitable foraging habitat possibly utilised by this species.	-
Blue-winged Parrot	Neophema chrysostoma	VU, Mr	Moderate - the project area has suitable habitat to support this species.	-
Brown Treecreeper (south-eastern)	Climacteris picumnus (victoriae)	VU	Recorded - species previously recorded during assessments. WSP also recorded this species within the broader property, to the north, east and west of the proposed quarry site.	HMS (2021) ELA (2023a)
Brush-tailed Phascogale	Phascogale tapoatafa	vu	Recorded - species previously recorded during assessments.	HMS (2021)
Cattle Egret	Bubulcus ibis	Mr	Moderate - There is some suitable habitat within the haul road area.	-
Crested Bellbird	Oreoica gutturalis	en	Moderate - the project area has suitable foraging habitat possibly utilised by this species.	-
Diamond Firetail	Stagonopleura guttata	VU, vu	Recorded - species previously recorded during assessments.	HMS (2021) ELA (2023a)
Fork-tailed Swift	Apus pacificus	M, Mr	Moderate - the project area has suitable foraging habitat to support this species.	
Grey-crowned Babbler	Pomatostomus temporalis	vu	High - recorded within the broader property, but outside of the proposed quarry footprint.	HMS (2021) WSP (2023)
Hooded Robin	Melanodryas cucullata	EN, vu	Recorded - species previously recorded during assessments.	HMS (2021) ELA (2023a)
Lace Monitor	Varanus varius	en	Recorded - species previously recorded during assessments.	ELA (2023a)
Little Eagle	Hieraaetus morphnoides	vu	High - recorded within the broader property, but outside of the proposed quarry footprint.	HMS (2021)
Painted Honeyeater	Grantiella picta	VU, vu	Moderate - despite no mistletoe being recorded, the species can feed on insects and nectar of eucalypts and therefore may utilise the project area for foraging.	-
Rainbow Bee- eater	Merops ornatus	Mr	Recorded - one individual recorded by WSP within the proposed quarry footprint, and also recorded during previous assessments.	ELA (2023a) WSP (2023)
Southern Whiteface [^]	Aphelocephala leucopsis	VU	High - recorded within the broader property, but outside of the proposed quarry footprint.	WSP (2024)
Speckled Warbler	Pyrrholaemus sagittatus	en	Recorded - species previously recorded during assessments.	HMS (2021) ELA (2023a)

COMMON NAME	SCIENTIFIC NAME	STATUS	LIKELIHOOD OF OCCURRENCE	RECORDED BY
Square-tailed Kite	Lophoictinia isura	vu	Recorded - species previously recorded during assessments	ELA (2023a)
Swift Parrot	Lathamus discolor	CR, Mr, cr	Recorded - species previously recorded during assessments	HMS (2021) ELA (2023c)
Turquoise Parrot	Neophema pulchella	vu	High – Four individuals were recorded within the broader property, but outside of the proposed quarry footprint.	HMS (2021)
White-throated Needletail	Hirundapus caudacutus	VU, M, Mr	Moderate - the project area has suitable foraging habitat to support this species.	-

Table legend

EPBC Act: CR = Critically Endangered, EN = Endangered, VU = Vulnerable, M = Migratory, Mr = MarineFFG Act: cr = critically endangered, vu = vulnerable, en = endangered^Not considered likely to occur or recorded by previous consultants

3.2.2.3 Gap analysis and verification

After site assessments and targeted surveys, WSP has differing results and/or departs with the findings and conclusions presented in the previous assessments as follows:

- WSP recorded one additional significant flora species within the proposed quarry site, Glaucous Flax-lily *Dianella longifolia* var. *grandis*, which is listed as critically endangered under the FFG Act (refer to Figure A.3). This species has not been previously recorded within the project area.
- WSP re-evaluated the likelihood of occurrence of Clover Glycine *Glycine latrobeana*, Southern Shepherd's Purse *Ballantinia antipoda* and Crimson Sun-orchid *Thelymitra X macmillanii*. These species were previously determined to have a moderate likelihood of occurrence by Eco Logical Australia despite not being recorded (Eco Logical Australia, 2023c). Further discussion pertaining to the results of the WSP Clover Glycine targeted surveys is provided in Section 3.2.3, and rationale for downgrading each species likelihood of occurrence is provided in Sections 4.1.1.1, 4.1.1.2 and 4.1.2.2.
- WSP re-evaluated the likelihood of occurrence for Southern Whiteface *Aphelocephala leucopsis* after it was
 recorded within the broader property by WSP in August 2024. This species was previously considered to have a low
 likelihood of occurrence by Eco Logical Australia (Eco Logical Australia, 2023c), but has since been re-evaluated to
 high (refer to Section 4.1.2.10).
- The previous habitat assessment for Swift Parrot *Lathamus discolor* required revision as previous assessments had deemed the entire project area (i.e. ~37.4 ha) as being suitable habitat for the species (Eco Logical Australia, 2023c). The results of the Swift Parrot habitat assessment undertaken by WSP ecologists are detailed in section 3.2.4.
- WSP concurs with Eco Logical Australia's determination of EPBC Act listed GBGW presence along Bridgewater-Maldon Road. However, WSP has re-evaluated the extent of the GBGW patch to match the extent of Plains Woodland EVC mapped in this area (Refer to Section 3.2.6.1).
- VQAs and qualification of Threatened Ecological Communities were verified by WSP. The results are provided in Section 3.2.5.2 and Section 3.2.5.3 respectively.

3.2.3 Clover Glycine targeted surveys

Clover Glycine is listed as Vulnerable under the EPBC Act and vulnerable under the FFG Act. In the previous impact assessment the species was previously determined to have a moderate likelihood of occurrence within the project area, despite not being recorded during targeted surveys (Eco Logical Australia, 2023c). The rationale for this decision was that the species was known to occur within the wider region and the project area was considered to support suitable habitat. Furthermore, Eco Logical Australia believed the flowering period may have been missed which would ultimately

reduce the likelihood of detecting the species (Eco Logical Australia, 2023c). Surveys were originally undertaken in December 2021 and then again in October 2022 (Eco Logical Australia, 2023a).

Clover Glycine targeted surveys were undertaken by WSP ecologists on four separate occasions during Spring 2023 from around mid-September to end-November, in line with the species known flowering period (Carter and Sutter, 2010). Surveys were intentionally undertaken at the beginning, middle and end of spring to account for any seasonal variability in the species' flowering period that year. Clover Glycine was not observed during these surveys.

3.2.4 Swift Parrot habitat assessment

Swift Parrot is listed as Critically Endangered and Marine under the EPBC Act and critically endangered under the FFG Act. A total of 11 Swift Parrots were recorded opportunistically by Eco Logical Australia during their VQA assessment in May 2023. Sightings were recorded within the southern access route option, south of the quarry boundary, and east of the proposed quarry (Eco Logical Australia, 2023c). This confirmed the species' presence which had previously been assumed based on a potential sighting east of the proposed quarry, in combination with the presence of suitable habitat (Habitat Management Services, 2021). Despite no Swift Parrot records within the preferred haul road alignment, areas supporting the species' key foraging trees are considered suitable habitat (i.e. along Bridgewater-Maldon Road). The previous assessment concluded that the Project would result in the loss of 37.4 ha of woodland habitat which supports Swift Parrot key foraging tree species (Eco Logical Australia, 2023c).

Swift Parrot canopy transects

WSP ecologists undertook further Swift Parrot habitat assessments to refine the impact area by identifying habitat resources likely to be utilised by this species while foraging and dispersing throughout the landscape during the cooler months, and excluding habitat resources not primarily utilised by this species on mainland Australia. This includes bare ground, grassy understorey and non-preferred tree canopy species.

A total of 277 points were taken at 10 m intervals along seven transects throughout the proposed quarry site. Of these, 186 points (67%) intersected the presence of a key foraging tree species. This percentage was then used to refine the area of impact to Swift Parrot habitat, resulting in an area of approximately 24.71 ha (refer to Section 4.1).

3.2.5 Native vegetation

3.2.5.1 EVC mapping verification

On the 28-29 November 2023, two qualified WSP botanists verified the vegetation mapping presented in the previous impact assessment report (Eco Logical Australia, 2023c). Upon assessment, WSP concurred that the proposed quarry area comprised one patch of Hillcrest Herb-rich Woodland (EVC 70), which extends to the eastern boundary of the quarry, and a smaller patch of Plains Woodland (EVC 803) along the north-western boundary of the quarry.

The haul road alignment primarily traverses through cleared paddocks and now connects to Bridgewater-Maldon Road via Stones Road. Previously, three patches of native vegetation were mapped within the haul road alignment by Eco Logical Australia. The small patch of Plains Woodland along Murphy Road was determined by WSP to have < 25% cover and was therefore not considered to be a patch of native vegetation. Of the reaming two patches that were previously mapped, one is no longer relevant to the assessment due to the updated alignment footprint. Therefore, only one patch of native vegetation now intersects the current haul road alignment.

3.2.5.2 Vegetation Quality Assessments verification

The native vegetation verification process involved WSP botanists undertaking VQA assessment on the patches of native vegetation within the quarry site. These were completed without reference to the previous VQA scores attributed by Eco Logical Australia (Eco Logical Australia, 2023c) to mitigate potential assessor bias. The exception is the VQA scoring of Plains Woodland EVC 803 along the Stones Road, the haul road alignment, as assessed by Eco Logical Australia (Eco Logical Australia, 2023c) which was verified by WSP in 2024.

A continuous area of the same EVC is termed a 'habitat zone'. Different habitat zones exists where there are different EVCs present and/or discrete (non-continuous) patches of the same EVC. A separate VQA was conducted for each habitat zone. The results are provided below in Table 3.10, including a comparison of the final condition score assigned by both WSP and Eco Logical Australia.

Table 3.10 Vegetation Quality Assessment (VQA) results for EVCs identified in the project area

PROJECT AREA			QUARF	HAUL ROAD	
HABITAT Z	ONE		1A	2A	3A
Bioregion			Goldfields	Goldfields	Goldfields
EVC Name (initials)		Hillcrest Herb-rich Woodland	Plains Woodland	Plains Woodland
EVC Numbe	r		70	803	803
EVC Conser	vation Status		Depleted	Endangered	Endangered
		Max Score	Score	Score	Score
	Large Old Trees	10	5	4	-
	Canopy Cover	5	5	5	-
	Understorey	25	20	15	-
tion	Lack of Weeds	15	11	13	-
Condi	Recruitment	10	10	10	-
Site	Organic Litter	5	3	5	-
	Logs	5	5	5	-
	EVC Standardiser	-	1	1	-
	Standardised Score	75	59	57	-
be	Patch Size	10	8	8	-
ndsca value	Neighbourhood	10	5	4	-
La	Distance to Core	5	4	4	-
Total 100		100	76	73	-
WSP Habita	t (Condition) Score	1	0.76	0.73	-
ELA Habita Australia, 20	t (Condition) Score (Eco Logical 23c)	1	0.83	0.63	0.56

The VQA score was multiplied by the extent of the habitat zone, in hectares, to give a value in habitat hectares for each patch of native vegetation. A summary of the habitat hectare results as determined by WSP and Eco Logical Australia is provided in Table 3.11.

AREA	ZONE	CONE ECOLOGICAL VEGETATION CLASS		WSP RI	ESULTS	ELA RESULTS	
			AREA (HA)	VQA SCORE	HABITAT HECTARE	VQA SCORE	HABITAT HECTARE
urry te	1A	Hillcrest Herb-rich Woodland (EVC 70)	34.281	0.76	26.05	0.83	28.45
Qua Si	1B	Plains Woodland (EVC 803)	2.424	0.73	1.77	0.63	1.53
Haul Road	3A	Plains Woodland (EVC 803)	0.179	0.56	0.100	0.56	0.100
Totals			36.884	-	27.92	-	30.08

Table 3.11 Summary of Vegetation Quality Assessments for patches of native vegetation within the project area

3.2.5.3 Trees

For this assessment, trees within a 20m buffer of the project area were recorded. Note, this assessment did not account for small trees in patches, except for those associated with the haul road alignment which were recorded to determine impacts as a result of Tree Protection Zone (TPZ) encroachment.

A total of 128 trees were recorded. Of these, one is a large, scattered tree as per the most appropriate EVC benchmark. Of the remaining trees, 106 are large canopy trees in patches and 21 are small trees in patches (located along the haul road alignment).

A total of 12 trees were recorded as providing arboreal habitat in the form of hollows. This comprised one tree with small hollows (< 7cm), nine trees with medium sized hollows (7-15 cm) and two trees with large hollows (> 15 cm).

Tree results are summarised in Table 3.12. A detailed tree data table is provided in Appendix D and the location of each tree is shown on Figure A.4 in Appendix A.

Table 3 12 Summar	v results of trees	recorded within	20m	of the	project	area
	y 1000110 01 11000	recorded within	20111		project	arca

PROJECT AREA	SPECIES	LARGE TREES IN PATCHES	SMALL TREES IN PATCHES	LARGE SCATTERED TREES	SMALL SCATTERED TREES	TOTAL TREES
Quarry	Grey Box Eucalyptus macrocarpa	76	N/A	0	0	76
	Yellow Box Eucalyptus melliodora	1	N/A	0	0	1
Haul Road	Grey Box Eucalyptus macrocarpa	23	4	1	0	28
	Yellow Box Eucalyptus melliodora	3	0	0	0	3
	Yellow Gum Eucalyptus leucoxylon subsp. leucoxylon	3	17	0	0	20
Total	-				·	128

3.2.6 Threatened Ecological Community Assessments

Threatened Ecological Communities were assessed to determine their presence within the project area. The results of these assessments are provided below.

3.2.6.1 EPBC Act Threatened Ecological Communities

The previous impact assessment (Eco Logical Australia, 2023c) determined that the north-west area of the proposed quarry site (attributed to Plains Woodland EVC 803) supported approximately 2.4 ha of native vegetation that qualified as an EPBC Act listed Threatened Ecological Community; *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* (GBGW) (Eco Logical Australia, 2023c). It's worth noting that when Eco Logical Australia surveyed in 2021, not all of this area met the criteria to qualify as a Threatened Ecological Community. However, a reduction in grazing pressure and higher rainfall in 2022 resulted in improved condition for the growth and reproduction of native grasses. Subsequently, an area of 2.4 ha was deemed to meet the key determination criteria when reassessed in 2023 (Eco Logical Australia, 2023c). Another patch of GBGW was also previously identified by Eco Logical Australia along Bridgewater-Maldon Road (Eco Logical Australia, 2023b). At the time, this mapped patch of GBGW was outside of the project area.

WSP ecologists verified the presence of a Threatened Ecological Community within the quarry site by undertaking an assessment. Results of the survey and assessments are detailed below.

Grey Box Grassy Woodland and Derived Native Grassland of South-eastern Australia

To determine whether the threatened ecological community GBGW was present within the project area, WSP ecologists assessed the patch of Plains Woodland within the proposed quarry site against key diagnostic characteristics stipulated in the *Listing Advice for Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia* (TSSC, 2010). The key diagnostic characteristics are designed to allow identification of the ecological community irrespective of the season. Areas of vegetation that do not meet all the key diagnostic characteristics are not the nationally listed ecological community.

Two plots, both located within the 2.4 ha patch previously identified as GBGW by Eco Logical Australia, were assessed by WSP ecologist. The results of the WSP assessment are presented in Table 3.13 and the area mapped as GBGW within the quarry site is shown on Figure A.4 in Appendix A.



Grey Box Grassy Woodland in the proposed quarry site

Eco Logical Australia's determination of GBGW presence along Bridgewater-Maldon Road was verified. This assessment was considered to accurately reflect the quality of GBGW along Stones Road. The extent of GBGW and Plains Woodland EVC 803 mapped in this area has been slightly revised – refer to Figure A.4 in Appendix A.

Table 3.13 Assessment of Grey Box Grassy Woodland and derived native grasslands

KEY DIAGNOSTIC CHARACTERISTICS	PLOT 1	PLOT 2
"The ecological community occurs on low slopes and plains from central NSW, through northern and central Victoria into South Australia. Disjunct occurrences are	Yes – the proposed project area is located within central Victoria.	Yes – the proposed project area is located within central Victoria.
known from near Melbourne and in the Flinders-Lofty Block Bioregion of South Australia."		

	IOSTIC CHARACTERISTICS	PLOT 1 PLOT 2		
"The vegetati is typically a	ion structure of the ecological community woodland to open forest."	Yes – the vegetation structure associated with this ecological community was attributed to Plains Woodland EVC 803.	Yes – the vegetation structure associated with this ecological community was attributed to Plains Woodland EVC 803.	
"The tree can cover) by Euc tree species n certain circum Box but are n	opy is dominated (\geq 50% canopy crown calyptus microcarpa (Grey Box). Other nay be present in the canopy and, in instances, may be co-dominant with Grey never dominant on their own."	Yes – Grey Box is the dominate tree canopy species.	Yes – Grey Box is the dominate tree canopy species.	
"The mid lay composition a dense. The m than 30% wit	er comprises shrubs of variable and cover, from absent to moderately id layer usually has a crown cover of less h local patches up to 40% crown cover."	Shrub layer consists of Saloop Einadia hastata, Sifton Bush Cassinia sifton and Hedge Saltbush Rhagodia spinescens.	Shrub layer consists of Golden Wattle <i>Acacia pycnantha</i> .	
"The ground development absent to mos commonly pr graminoid ge <i>Enteropogon</i> , more of the c <i>Einadia</i> , <i>Encu</i> <i>Sclerolaena</i> ."	layer also is highly variable in and composition, ranging from almost stly grassy to forb-rich. Ground layer flora esent include one or more of the nera: <i>Rytidosperma, Austrostipa, Elymus,</i> <i>Dianella</i> and <i>Lomandra</i> ; and one or henopod genera: <i>Atriplex, Chenopodium,</i> <i>hylaena, Maireana, Salsola</i> and	Ground layer species recorded include Rough Spear-grass <i>Austrostipa scabra</i> subsp. <i>falcata</i> , Bristly Wallaby-grass <i>Rytidosperma</i> <i>setaceum</i> , Hill Wallaby-grass <i>Rytidosperma erianthum</i> and Nodding Saltbush <i>Einadia nutans</i> . Other species recorded include Tall Raspwort <i>Gonocarpus elatus</i> and Fuzzy New Holland Daisy <i>Vittadinia cuneata</i> .	The ground layer consisted of Rough Spear-grass and Bristly Wallaby- grass. Other ground species recorded include Grey Parrot-pea <i>Dillwynia</i> <i>cinerascens s.l.</i> , Tall Raspwort and Common Raspwort <i>Gonocarpus</i> <i>tetragynus</i> .	
"Derived gras community, v been mostly r native ground more of the to	sslands are a special state of the ecological whereby the canopy and mid layers have removed to <10% crown cover but the I layer remains largely intact, with 50% or otal vegetation cover being native."	No – Grey Box canopy layer is present.	No – Grey Box canopy layer is present.	
CONDITION	I THRESHOLDS			
Criteria that are	1a. The minimum patch size is 0.5 hectare;	Yes – patch size is ~ 2.4 ha.	Yes – patch size is ~ 2.4 ha.	
broadly applicable	AND 1b. The canopy layer contains Grey Box (<i>E. microcarpa</i>) as the dominant or co- dominant tree species;	Yes – Grey Box is the dominate tree canopy species.	Yes – Grey Box is the dominate tree canopy species.	
	AND 1c. The vegetative cover of non-grass weed species in the ground layer is less than 30% at any time of the year.	1c. Yes – herbaceous weeds less than 30%. Only Rat's-tail Fescue <i>Vulpia myuros</i> was recorded with 2% cover.	1c. Yes – during the assessment, no herbaceous weeds were recorded within this plot.	
Additional criteria that apply to smaller woodland patches (0.5 to <2 ha in area) with	2a. At least 50% of the vegetative cover in the ground layer comprises perennial native species at any time of the year."AND2b. 8 or more perennial native species are present in the mid and ground layers at any time of the year.	N/A	N/A	

KEY DIAGN	IOSTIC CHARACTERISTICS	PLOT 1	PLOT 2	
tree crown cover >10%				
Additional criteria that apply to larger woodland patches with a well- developed	 3a. At least 8 trees/ha are hollow bearing or have a diameter at breast height of 60 cm or more; AND 3b. at least 10% of the vegetative ground cover comprises perennial native grasses at any time of the year; 	 3A. No - 9 Large trees over 70 DBH in the ~ 2.4 ha area. 3B. Yes – high coverage of perennial native grasses, predominantly Rough Spear-grass (25% cover). 	 3A. No - 9 Large trees over 70 DBH in the ~ 2.4 ha area. 3B. Yes – perennial native grass species at approximately 26% with coverage primarily due to Rough Spear-grass. 	
canopy (2 ha or more in area)	OR 4a. At least 20 trees/ha have a diameter at breast height of 12 cm or more; AND 4b. at least 50% of the vegetative cover in the ground layer comprises perennial native species.	Yes – at least 20 trees/ha have a diameter at breast height of 12 cm or more and at least 50% of the vegetative cover in the ground layer comprises perennial native species.	Yes – at least 20 trees/ha have a diameter at breast height of 12 cm or more and at least 50% of the vegetative cover in the ground layer comprises perennial native species.	
Additional criteria that apply to patches where the canopy is less developed or absent (derived grassland) (≥0.5 ha in area)	 5a. Woodland density does not meet criteria 3a or 4a, or is a derived grassland with clear evidence that the site formerly was a woodland with a tree canopy dominated or co-dominated by <i>E. microcarpa</i>; AND 5b. At least 50% of the vegetative cover in the ground layer is made up of perennial native species at any time of the year; AND 5c. 12 or more native species are present in the ground layer at any time of the year. 	N/A	N/A	
Summary	Does the patch meet criteria for listed threatened community?	Yes – the patch of native vegetation within the proposed quarry site meets the key diagnostic criteria and condition thresholds for EPBC listed Grey Box Grassy Woodland Threatened Ecological Community.	Yes – the patch of native vegetation within the proposed quarry site meets the key diagnostic criteria and condition thresholds for EPBC listed Grey Box Grassy Woodland Threatened Ecological Community.	

3.2.6.2 FFG Act listed threatened communities

The project area was found to support one FFG Act listed threatened community; Victorian Temperate Woodland Bird Community (VTWBC). Based on the results of the current, and previous, assessment/s, six VTWBC species have been recorded within the project area, including Jacky Winter which was recorded by WSP ecologists. The other five VTWBC species that have previously been recorded are Brown Treecreeper, Diamond Firetail, Hooded Robin, Speckled Warbler and Swift Parrot (Eco Logical Australia, 2023c, Habitat Management Services, 2021)

According to the likelihood of occurrence assessments, an additional four VTWBC species are considered to have a moderate or higher likelihood of occurrence based on the presence of suitable habitat and/or previous records within the broader property. This includes Barking Owl, Grey-crowned Babbler, Painted Honeyeater and Turquoise Parrot.

3.2.7 Photolog



Photo 3.1 EPBC Act GBGW floristics Plot 1



Photo 3.2 EPBC Act GBBW floristics Plot 2



Photo 3.3 Cowslips Diuris chryseopsis



Photo 3.4 Twining Glycine Glycine clandistina



Photo 3.5 Tiny Daisy Brachyscome perpusilla



Photo 3.7 Yam Daisy Microseris walteri



Photo 3.6 Glaucous Flax-lily *Dianella longifolia* var. *grandis* – FFG Act critically endangered



Photo 3.8 Leopard Orchid Diuris pardina



Photo 3.9 Annual Everlasting Chrysocephalum vitellinum



Photo 3.10 Slender Sun Orchid Thelymitra pauciflora



Photo 3.11 EVC 70 Hill Crest Herb-rich Woodland



Photo 3.12 EVC 803 Plains Woodland

4 Impact assessment

The proposed project are likely to result in the loss of 36.884 ha of native vegetation⁴. The impact of this loss on federal and state listed flora, fauna and ecological communities are discussed below.

4.1 POTENTIAL IMPACTS ON EPBC ACT MNES

Following desktop and site assessments, there were 15 MNES considered for potential significant impacts as per the *Matters of National Environmental Significance Significant impact guidelines 1.1* (Department of the Environment, 2013), or the otherwise most appropriate Commonwealth guidelines. These MNES are discussed in Sections 4.1.1 - 4.1.3 below.

In summary, one Threatened Ecological Community (i.e. 2.60 ha of GBGW) and six significant fauna species listed under the EPBC Act are considered to have a moderate or higher likelihood of occurrence based on the presence of high-quality suitable habitat, nearby records and/or the results of previous surveys. This includes Blue-winged Parrot, Brown Treecreeper, Diamond Firetail, Hooded Robin, Southern Whiteface and Swift Parrot.

A 'significant impact' is defined under the EPBC Act as 'an impact that is important, notable, or of consequence, having regard to its context or intensity'(DoE, 2013). Assessment under the relevant significant impact criteria were completed for each MNES considered to have a moderate or higher likelihood of occurrence. The Significant Impact Assessments determined that the Threatened Ecological Community and five of the six EPBC Act listed fauna speices were at risk of being significantly impacted by the proposed project (refer to Table 4.1 for a summary).

MNES	SCIENTIFIC NAME	EPBC ACT STATUS	AREA OF IMPACT (HA)^	RISK OF SIGNIFICANT IMPACT				
SIGNIFICA	SIGNIFICANT FAUNA							
Brown Treecreeper	Climacteris picumnus (victoriae)	Vulnerable	36.884	Based on the Significant Impact Assessment, it is concluded that the project has a high risk of a significant impact on the occupancy of the species, habitat critical to its survival, and potential disruption to breeding cycles of the Brown Treecreeper. The breeding disruption will likely be via noise, vibration and dust impacts both during construction and ongoing operations of the quarry.				
Diamond Firetail	Stagonopleura guttata	Vulnerable	36.884	Based on the Significant Impact Assessment, it is concluded that the project has a high risk of a significant impact on the occupancy of the species, habitat critical to its survival, and potential disruption to breeding cycles of the Diamond Firetail. The breeding disruption will likely be via noise, vibration and dust impacts both during construction and ongoing operations of the quarry.				

 Table 4.1
 Summary of EPBC Act listed species and Threatened Ecological Communities considered to have at least a moderate risk of a significant impact, and the associated area of impact as a result of the project.

 $^{^4}$ Area is exclusive of the one large Scattered Tree area (0.07 ha) – which is accounted for as an area, per the Guidelines

MNES	SCIENTIFIC NAME	EPBC ACT STATUS	AREA OF IMPACT (HA)^	RISK OF SIGNIFICANT IMPACT
Hooded Robin	Melanodryas cucullata	Endangered	36.884	The project will result in direct loss of approximately 36.884 ha of woodland habitat used by the Hooded Robin. Based on the Significant Impact Assessment, it is concluded that the project has a high risk of a significant impact on the occupancy of the species, habitat critical to its survival, and potential disruption to breeding cycles of the Hooded Robin. The breeding disruption will likely be via noise, vibration and dust impacts both during construction and ongoing operations of the quarry.
Southern Whiteface	Aphelocephala leucopsis	Vulnerable	36.884	The project will result in direct loss of approximately 36.884 ha of woodland habitat used by the Southern Whiteface. Based on the Significant Impact Assessment, it is concluded that the project has a high risk of significant impact to habitat critical to the species survival.
Swift Parrot	Lathamus discolor	Critically Endangered, Marine	24.71	The project will result in direct loss of approximately 24.71 ha (67% of the total 36.884 ha to be removed) of woodland foraging habitat used by Swift Parrots. Based on the Significant Impact Assessment, it is concluded that the project has a high risk of a significant impact on the occupancy of the species and the availability of habitat critical to the survival of this species.
THREATE	NED ECOLOGI	CAL COMMU	NITY	
Grey Box Grassy Woodland and Derived Native Grassland of South-eastern Australia		odland Endangered 2.60 ha		 The project will result in direct loss of approximately 2.60 ha of GBGW Threatened Ecological Community. Based on the Significant Impact Assessment, it is concluded that the project has a high risk of a significant impact on the Grey Box Grassy Woodland and Derived Native Grassland of Southeastern Australia. The project will result in: Direct loss of 2.60 ha of the ecological community. Fragmentation of the ecological community as a result of
				 removal. Groundwater impacts that may impact water supply for the ecological community (although the impacts are unknown as modelling will need to be completed). Impact to intact surrounding vegetation from dust (during dry times) as a result of vehicle movement. Impact to intact surrounding vegetation from invasive species that can opportunistically utilise cleared areas for dispersal on to the site.

^ Area is exclusive of the one large Scattered Tree area (0.07 ha) – which is accounted for as an area, as per the Guidelines

4.1.1 Flora

Based on the results of current and previous assessments, no EPBC Act listed flora species have been recorded within the project area. Furthermore, WSP determined that no EPBC Act listed flora species are moderately or highly likely to occur within the project area. The rationale for downgrading the likelihood of occurrence from moderate to low for EPBC Act listed Clover Glycine and Southern Shepherd's Purse are discussed below.

4.1.1.1 Clover Glycine

Clover Glycine (listed as Vulnerable under the EPBC Act) was determined by Eco Logical Australia to have a moderate likelihood of occurrence due to the species known occurrence in the wider region and the presence of optimal potential habitat within the project area (Eco Logical Australia, 2023c). Clover Glycine is widespread across Victoria but of sporadic occurrence and is rarely encountered. It mainly occurs in grassland and grassy woodland habitats, less often in dry forests, and only rarely in heathland. In Victoria, Clover Glycine grows in a range of soil types including alluvial soils, and those derived from sandstones, mudstones, granite and basalt (Carter and Sutter, 2010). The species generally flowers in spring in the lower elevation parts of its range (Carter and Sutter, 2010).

In Victoria, it is documented that the species occurs in the Australian Alps, Naracoorte Coastal Plain, South Eastern Highlands, South East Coastal Plain, Victorian Midlands and Victorian Volcanic Plains bioregions (Carter and Sutter, 2010), with records to a lesser degree within the Goldfields Bioregion (DEECA, 2024d). Furthermore, the WSP desktop search returned only one record from 2011 within a 10 km radius of the project area.

WSP re-evaluated the species likelihood of occurrence to low in consideration of the abovementioned factors, combined with the lack of detection during multiple targeted surveys over several years. In consideration of the assessment criteria for a Vulnerable species, (DoE, 2013) an important population is not considered likely to be present within the project area. The project is subsequently considered to have a low risk of a significant impact to this species. Therefore, a Significant Impact Assessment for Clover Glycine was not undertaken, and this species is not considered further.

4.1.1.2 Southern Shepherd's Purse

Southern Shepherd's Purse (EPBC Act Endangered) was determined by Eco Logical Australia to have a moderate likelihood of occurrence due to the presence of optimal potential habitat within the project area (Eco Logical Australia, 2023c). Despite not being recorded during targeted surveys, Eco Logical Australia stated it was possible that the species was not visible at the time assessments were undertaken (Eco Logical Australia, 2023c).

Southern Shepherd's Purse is a small annual plant belonging to the Brassicaceae family. The species was thought extinct until rediscovered in Victoria in 1983. Records from Mount Alexander indicate that this species has very specific habitat requirements, occurring on "gently to steeply sloping granite rockplates, usually with an easterly or south-westerly aspect. It grows on seasonally moist moss mats on a shallow soil layer and occasionally growing directly in shallow soil pockets. It is not found on moss mats that utilize deeper soils. Sites in which it occurs are usually open, containing only light canopy cover from surrounding trees including the Manna Gum, Eucalyptus viminalis, and Messmate Stringybark, Eucalyptus oblique. The habitat is classified as Granitic Hills Woodland Ecological Vegetation" (DCCEEW, 2024b).

Following recent surveys undertaken by WSP, the likelihood of occurrence for Southern Shepherd's Purse was reevaluated to low. This decision was based on the absence of this species during surveys combined with the lack of specific habitat features within the site. For instance, the dominate tree type within the project area is Grey Box, not Manna Gum or Messmate Stringybark and the site does not support Granitic Hills Woodland EVC. This species is considered unlikely to be impacted by the project. Therefore, a Significant Impact Assessment for Southern Shepherd's Purse was not undertaken, and this species is not considered further.

4.1.2 Fauna

According to the findings of WSP surveys, and the results of previous assessments, a total of four EPBC Act significant fauna species have been recorded within the project area: Swift Parrot, Brown Treecreeper, Diamond Firetail and Hooded

Robin. An additional two species listed as Marine under the EPBC Act were also recorded: Black-eared Cuckoo and Rainbow Bee-eater (refer to Figure A.3).

A further six EPBC Act listed fauna species were considered to have a moderate or high likelihood of occurrence based on suitable habitat features within the project area. This included: Blue-winged Parrot, Cattle Egret, Fork-tailed Swift, Painted Honeyeater, Southern Whiteface and White-throated Needletail.

4.1.2.1 Black-eared Cuckoo

Black-eared Cuckoo *Chalcites osculans* (EPBC Act listed Marine) is most commonly found in drier inland habitats such as mulga and mallee woodlands, lignum, and riparian areas (Birdlife Australia, 2024a). It is a breeding migrant to subcoastal southern areas, which encompasses the project area, where the species has been recorded (Pizzey and Knight, 2007). Two individuals were recorded during surveys within the patch of Hillcrest Herb-rich Woodland at the proposed quarry site (Eco Logical Australia, 2023a). All mapped native vegetation within the project area (36.884 ha) is considered suitable habitat for this species. Despite this, the area of impact is small in relation to potential habitat available in the wider area, and the highly dispersive migratory nature of the species. Black-eared Cuckoo is unlikely to be impacted by the proposed works and has therefore not been considered further for Significant Impact Assessments for MNES.

4.1.2.2 Blue-Winged Parrot

Blue-winged Parrot *Neophema chrysostoma* (EPBC Act listed Vulnerable and Marine) is found in a range of habitats, but favours eucalypt forests and grassy woodlands where they forage for the seeds of native and introduced grasses, herbs and shrubs (DCCEEW, 2023d). Blue-winged Parrots breed in Tasmania, south-eastern South Australia and southern Victoria, utilising live and dead trees with suitable hollows for their nests (DCCEEW, 2023d).

The project area was found to support potential Blue-winged Parrot habitat, including large trees which may provide roosting and nesting habitat. In previous assessments, it was determined that the project would impact on habitat that had the potential to be critical to the survival of the species. This, combined with the uncertainty around the species use of the project area resulted in a significant impact being assumed likely for this species (Eco Logical Australia, 2023c).

Blue-winged Parrot has not been recorded in the project area, and no important populations are known to occur within the broader woodland patch contiguous with the project area. This species is relatively wide-spread, foraging in an array of woodland habitats, and is known to occupy cleared areas, including pastures and other agricultural areas (Pizzey and Knight, 2007). Given this, there is a substantial suitable habitat for this species, including areas surrounding and contiguous with the project area. A Significant Impact Assessment was undertaken to determine whether the project was likely to significantly impact an important population of Blue-winged Parrot. The assessment determined that there is a low risk of a significant impact, predomaintely due to the species' varied habitat preferences, migratory nature and the amount of habitat available in the local area (refer to Appendix E1). This species is not considered further in this report.

4.1.2.3 Brown Treecreeper

Brown Treecreeper *Climacteris picumnus (victoriae)* is listed under the EPBC Act as Vulnerable. Since the species listing under the EPBC Act in January 2023, one individual was recorded within the proposed quarry site. However, this number does not represent a true indication of the population size within the project area which is far greater based on observations during previous assessments before the species was listed (Eco Logical Australia, 2023c). All mapped native vegetation within the project area (36.884 ha) is considered suitable habitat for this species. A Significant Impact Assessment was undertaken to determine whether the project was likely to significantly impact an important population of Brown Treecreeper. The assessment determined that there is a high risk of a significant impact to Brown Treecreeper (refer to Appendix E2).

4.1.2.4 Cattle Egret

Cattle Egret *Bubulcus ibis* (EPBC Act listed Marine) is commonly associated with the habitats of farm animals, particularly cattle. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low

emergent vegetation and abundant aquatic flora. The haul road alignment supports potential habitat for this species. However, the area of impact to Cattle Egret habitat is small in relation to potential habitat available in the local area. This species is unlikely to be impacted as a result of the project and is therefore not considered further in this impact assessment report.

4.1.2.5 Diamond Firetail

Diamond Firetail *Stagonopleura guttata* is listed under the EPBC Act as Vulnerable. Several individuals were recorded during pervious assessments including two individuals recorded within the proposed quarry site, near the dam in the far north-west corner (Eco Logical Australia, 2023c). All mapped native vegetation within the project area (36.884 ha) is considered suitable habitat for this species. A Significant Impact Assessment was undertaken to determine whether the project was likely to significantly impact an important population of Diamond Firetail. The assessment determined there is a high risk of a significant impact to Diamond Firetail (refer to Appendix E3).

4.1.2.6 Fork-tailed Swift & White-throated Needletail

Fork-tailed Swift *Apus pacificus* (EPBC Act listed Migratory and Marine) and White-throated Needletail *Hirundapus caudacutus* (EPBC Act listed Vulnerable, Migratory and Marine) are predominately aerial species. While the project area supports suitable foraging habitat which may be occasionally utilised, both species are unlikely to be impacted as a result of the project. Therefore, these species are not considered further.

4.1.2.7 Hooded Robin

Hooded Robin *Melanodryas cucullate* is listed as Endangered under the EPBC Act. Several individuals were recorded during pervious assessments, including one individual recorded within the proposed quarry site and one located approximately 16 metres outside the quarry boundary (Eco Logical Australia, 2023c). All mapped native vegetation within the project area (36.884 ha) is considered suitable habitat for this species. A Significant Impact Assessment was undertaken to determine whether the project was likely to significantly impact a population of Hooded Robin. The assessment determined there was a high risk of a significant impact to Hooded Robin as a result of the project (refer to Appendix E4).

4.1.2.8 Painted Honeyeater

Painted Honeyeater *Grantiella picta* (EPBC Act listed Vulnerable) occurs in dry forests and woodland habitats. Mistletoes in the genus *Amyema* is largely responsible for the breeding distribution of Painted Honeyeater, and is also the primary food source for the species. The previous impact assessment determined this species had a moderate likelihood of occurrence based on the presence of potential foraging habitat within the project area (Eco Logical Australia, 2023c). However, mistletoe has not been recorded within the project area during any of the previous assessments. Furthermore, the 2017 VBA record is located over 8 km away, not near or adjoining the habitat present within the project area. Whilst the project area my provide suitable foraging habitat, Painted Honeyeater is unlikely to occur at the site in high densities. Therefore, Painted Honeyeater is unlikely to be impacted as a result of the project and is therefore not considered further.

4.1.2.9 Rainbow Bee-eater

Rainbow Bee-eater *Merops ornatus* (EPBC Act listed Marine) is a relatively common species that has adapted to disturbed areas, and is most commonly found in open forests, woodlands, and cleared areas (Pizzey and Knight, 2007). The species nests in tunnels and burrows in banks and cuttings, and has been observed using disturbed sites such as quarries and mines for nesting (Birdlife Australia, 2024b).

Previous assessments recorded this species opportunistically within the 100 m buffer of the proposed quarry (Eco Logical Australia, 2023a). In addition, WSP recorded three individuals within the proposed quarry site. One was located along the northern boundary of the proposed quarry, within Herb Hillcrest Herb-rich woodland. The other two were observed together, in the south-western area of the same patch. All mapped native vegetation within the project area (36.884 ha) is considered suitable habitat for this species. However, given the highly mobile nature of the species, its generalist habitat

requirements, and its adaptability to disturbed sites, Rainbow Bee-eater is considered unlikely to be impacted by the proposed project. A Significant Impact Assessment for Rainbow Bee-eater was not undertaken and this species is not considered further.

4.1.2.10 Southern Whiteface

Southern Whiteface *Aphelocephala leucopsis* (EPBC Act listed Vulnerable) is a small bird that occur across most of mainland Australia south of the tropics. The species inhabits a wide range of open woodlands and shrublands with an understorey of grasses and shrubs, favouring habitat with low tree densities and an herbaceous understorey litter cover. One Southern Whiteface was recorded opportunistically by WSP in August 2024 within the border property during a site assessment. All mapped native vegetation within the project area (36.884 ha) is considered suitable habitat for this species. A Significant Impact Assessment was undertaken and determined that there was a moderate risk of a significant impact to Southern Whiteface (refer to Appendix E5).

4.1.2.11 Swift Parrot

Swift Parrot *Lathamus discolor* (EPBC Act listed Critically Endangered and Marine) is a migratory parrot, breeding in Tasmania and returning to forage on the mainland between the cooler months, roughly March-October. On the mainland, the species occurs in Victoria, the ACT, NSW and into southern Queensland. In Victoria, the highest numbers are usually recorded within the dry forests and woodlands of the box-ironbark region located on the inland slopes of the Great Dividing Range (Saunders and Tzaros, 2011). When on the mainland, the species forages opportunistically on nectar (predominantly from flowering eucalypts) and on lerp, and may utilise scattered trees, remnant vegetation and continuous forests (Saunders and Heinsohn, 2008). As nectar production and lerp densities are dependent on various factors, including seasonal conditions, occurrence across their range is difficult to predict and may vary substantially between years (Saunders and Tzaros, 2011).

Several Swift Parrot individuals were recorded opportunistically south and east of the proposed quarry by Eco Logical Australia during their VQA assessment in May 2023 (Eco Logical Australia, 2023c). For most fauna species, the area of impact will be the total area of vegetation loss (36.884 ha). The exception to this is the area of impact for Swift Parrot. Using the percentage of key foraging tree species obtained from the detailed Swift Parrot habitat assessment (67%) and extrapolating this percentage across the impact area, the anticipated impact to Swift Parrot is 24.71 ha of canopy habitat resource. A Significant Impact Assessment was undertaken to determine whether the project was likely to significantly impact a population of Swift Parrot (refer to Appendix E6). The assessment determined there was a high risk of a significant impact to Swift Parrot as a result of the project.

4.1.3 Threatened Ecological Community

One Threatened Ecological Community, *Grey Box Grassy Woodland and Derived Native Grassland of South-eastern Australia*, was also recorded within the proposed quarry site. Grey Box Grassy Woodland (GBGW) is listed as Endangered under the EPBC Act. This Threatened Ecological Community is described as being 'a woodland to open forest with a canopy dominated by eucalypts and an understorey with a moderately dense to sparse shrub layer and a ground layer of perennial and annual native forbs and graminoids' (TSSC, 2010).

This Threatened Ecological Community was mapped within the Plains Woodland EVC patch of vegetation at the quarry site and within some of the patches of Plains Woodland EVC along Stones Road and Bridgewater-Maldon Road. The area of impact to this Threatened Ecological Community as a result of the proposed project is anticipated to be 2.60 ha. A Significant Impact Assessment according to criteria for ecological communities was undertaken and determined there was a high risk of a significant impact to GBGW (refer to Appendix E7).

4.2 POTENTIAL IMPACTS ON FFG ACT LISTED VALUES

4.2.1 Flora

According to the findings of WSP surveys, and the results of previous assessments, a total of five FFG Act listed flora species have been recorded. This includes Buloke, Golden Cowslips, Glaucous Flax-lily, Late-flower Flax-lily and Small-flower Wallaby-grass. Impacts are anticipated to all five of these species as they are located within the project area (refer to Figure A.3). The number of each species recorded by WSP and Eco Logical Australia is provided in Table 4.2.

Also recorded during the WSP site assessment were three FFG Act protected flora species listed as 'Generally protected flora' and 10 FFG Act protected flora species listed as 'Restricted use protected flora'. This includes Golden Wattle *Acacia pycnantha*, Cranberry Heath *Astroloma humifusum*, Tiny Daisy *Brachyscome perpusilla*, Pink Fingers *Caladenia carnea*, Annual Everlasting *Chrysocephalum vitellinum*, Leopard Orchid *Diuris pardine*, Coarse Bottle-daisy *Lagenophora gunniana*, Beauty Buttons *Leptorhynchos tetrachaetus*, Yam Daisy *Microseris walteri*, Grey everlasting *Ozothamnus obcordatus*, Slender Sun Orchid *Thelymitra pauciflora*, Fuzzy New Holland Daisy *Vittadinia cuneata* and Shiny Everlasting *Xerochrysum viscosum* (Refer to Appendix C).

COMMON NAME	SCIENTIFIC NAME	FFG ACT STATUS	NUMBER IMPACTED	RCORDED BY
Buloke	Allocasuarina luehmannii	cr	2	ELA
			2	WSP
Glaucous Flax-lily	Dianella longifolia var. grandis	cr	2	WSP
Golden Cowslips	Diuris behrii	en	2	ELA
Late-flower Flax-lily	Dianella tarda	cr	2	ELA
Small-flower Wallaby-grass	Rytidosperma monticola	en	241	ELA
			193^	WSP

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l able 4.2	Summary of FFG Ac	t listed flora species,	and numbers,	recorded within the	project area

^ Note WSP recorded a total of 195 Small-flower Wallaby-grass but two individuals were located outside of the project area. Impacts to these two individuals are not anticipated.

Southern Swainson-pea (FFG Act listed endangered) was considered by Eco Logical Australia and WSP to have a moderate likelihood of occurrence. This determination is based on the presence of high-quality suitable habitat, nearby records and/or the results and timing of previous surveys.

Contrary to previous assessment determinations by Eco Logical Australia (2023c), WSP re-evaluated the likelihood of Crimson Sun Orchid (FFG Act listed vulnerable) from moderate to low. Crimson Sun Orchid is a natural hybrid that occurs sporadically in grassland, woodland and open forests where the parent species grow together. It flowers in late winter and early spring. Neither the Crimson Sun Orchid, nor the parent species, have been detected during any of the targeted flora surveys undertaken at the site. This is despite Crimson Sun Orchid's flowers being long lasting (RBGV, 2024). Had Crimson Sun Orchid been present within the project area, it most likely would have been detected. Furthermore, the closest VBA records of Crimson Sun Orchid are from Maldon, recorded in 1931 and 1932, just under 10 km away from the eastern edge of the proposed quarry boundary (but more than 10 km away from the centre of the project area which is how all desktop assessments were undertaken). More recent records from 1997 indicate the presence of Crimson Sun Orchid at Maldon Historic Reserve and Walmer Nature Conservation Reserve, both of which are located more than 12 km away. It is for these reasons that the species likelihood was downgraded to low.

4.2.2 Fauna

According to the findings of WSP surveys, and the results of previous assessments, seven FFG Act listed fauna species have been recorded within the project area. This includes one mammal (Brush-tailed Phascogale), one reptile (Lace Monitor) and five birds including Diamond Firetail, Hooded Robin, Speckled Warbler, Square-tailed Kite and Swift Parrot.

In addition, eight FFG Act listed fauna species are considered to have a moderate or higher likelihood of occurrence based on the presence of high-quality suitable habitat, nearby records and/or the results and timing of previous surveys. This includes one reptile (Bearded Dragon) and the following seven bird species: Barking Owl, Black Falcon, Crested Bellbird, Grey-crowned Babbler, Little Eagle, Painted Honeyeater and Turquoise Parrot.

4.2.3 Ecological Community

One FFG Act listed ecological community, Victorian Temperate Woodland Bird Community (VTWBC), was recorded within the project area. This threatened community is defined as 'a suite of bird species, mainly associated with drier woodlands on the slopes and plains north of the Great Dividing Range, that seem to have declined markedly in numbers since records began.' The community comprises up to 24 woodland bird species (DELWP, undated)

This FFG Act listed ecological community is considered to occur across all native vegetation patches within the project area, equating to a total area of 36.884 ha.

Based on the results of the current and previous assessments, six VTWBC species have been recorded within the project area. This includes Brown Treecreeper, Diamond Firetail, Hooded Robin, Jacky Winter, Speckled Warbler and Swift Parrot. An additional four VTWBC species are considered to have a moderate or higher likelihood of occurrence based on the presence of suitable habitat and/or previous records within the broader property. This includes Barking Owl, Greycrowned Babbler, Painted Honeyeater and Turquoise Parrot.

4.3 NATIVE VEGETATION IMPACTS

Vegetation clearance as per the Guidelines is summarised in terms of EVC and bioregional conservation significance for the project area. Three patches of native vegetation totalling 36.884 ha are proposed for removal (Table 4.3).

Of the 128 trees that were recorded within a 20 m buffer, 72 large trees (\geq 70 cm DBH) in patches and one large, scattered tree will be impacted by the proposed works (refer to Table 4.4 and Table 4.5).

EVC NUMBER	ECOLOGICAL VEGETATION CLASS	BIOREGION	BIOREGION CONSERVATION STATUS	PATCHES	AREA (HA)
70	Hillcrest Herb-rich Woodland	Goldfields	Depleted	1	34.281
803	Plains Woodland	Goldfields	Endangered	2	2.603
TOTAL					36.884^

Table 4.3 Native vegetation - clearance for the proposed project

^ Area is exclusive of the one large Scattered Tree area (0.07 ha) – which is accounted for as an area, as per the Guidelines

Table 4.4Large trees in patches impacted within the project area.

PROJECT AREA	SPECIES	LARGE TREES
Quarry	Grey Box Eucalyptus microcarpa	67
Haul road alignemnt	Grey Box Eucalyptus microcarpa	5
TOTAL	·	72

Table 4.5Scattered Trees impacted within the project area.

TREE ID	SPECIES	DBH	LARGE TREES	SMALL TREES	TOTAL
96	Grey Box Eucalyptus microcarpa	75	1	0	1

5 Recommendations

The Guidelines (DELWP, 2017c), *Planning for biodiversity* (DELWP, 2017d) and other legislation and policy (such as the EPBC Act) require that all efforts must be made to avoid and minimise impacts to native vegetation and habitat before resorting to offsets. Recommended measures to avoid, minimise and mitigate impacts to both native vegetation and other ecological values observed during field surveys (or otherwise considered likely to occur) are detailed in the section below, along with recommendations for further assessment that may be required.

The nature of the project (i.e. excavation of a quarry) makes the implementation of standard mitigation measures challenging. Quarry construction will be ongoing and therefore it is not possible to enforce work closure around important times of the year (i.e. during specific breeding seasons). Similarly, the entire footprint will be impacted as a result of the proposed works, reducing the ability to minimise impacts to native vegetation within the project area.

5.1 AVOIDANCE AND MINIMISATION OF IMPACTS ON NATIVE VEGETATION – PLANNING

5.1.1 Eco Logical Australia avoidance and minimisation recommendations (Eco Logical Australia, 2023c)

Avoidance

The *Blue Hills Quarry Impact Assessment* (Eco Logical Australia, 2023c) stated that some avoidance of native vegetation was achieved using the preliminary habitat and ecological values mapping provided in the Blue Hills Quarry Stage 2 Ecological Assessment (Eco Logical Australia, 2023a). This included the retention of a patch of EPBC Act listed Threatened Ecological Community Grey Box Grassy Woodland which would have otherwise been impacted based on the initial construction footprint (Eco Logical Australia, 2023c). Furthermore, early planning of the quarry avoided the north and east portion of the broader 560 ha property, as they boasted higher native vegetation and habitat values compared to the west. It has been noted that further avoidance of native vegetation would make the project unviable.

Nine haul road options were explored. At the time of the Eco Logical Australia assessment, haul road option 8 was chosen as it impacts the least amount of native vegetation and large trees. Furthermore, alignment option 8 avoided a large area of EPBC Act listed Grey Box Grassy Woodland which would have otherwise been impacted by three of the alternative haul road options (Eco Logical Australia, 2023c).

Overall, the project took into consideration native vegetation during the design and scouting for this project, and actively avoided native vegetation as much as possible, given the size of the project.

Minimisation

To minimize the impact of the project, the initial 50 ha quarry footprint was downsized to approximately 34 ha. There may be an opportunity to further refine impacts by reviewing the consequential losses from encroachment of the Tree Protection Zones (TPZ) within the preferred haul road alignment. However this requires consultation with a qualified arborist (Eco Logical Australia, 2023c).

5.1.2 WSP avoidance and minimisation recommendations

If possible, further avoidance and minimisation should be considered for the development of the site as per the Assessors' Handbook (DELWP, 2017a). The Assessors' Handbook requires that the proponent demonstrates avoidance and minimisation in the following ways:

- any strategic level planning over the project area
- site level planning

 that no feasible opportunities exist to further avoid and minimise impacts on native vegetation without undermining the key objectives of the proposal.

5.1.2.1 Strategic level planning

It has been determined that strategic level planning (e.g. avoiding this site in lieu of another) is not possible due to the location of the hornfels deposits. Instead, site level planning can be used to ensure the project has minimal impact.

5.1.2.2 Site level planning

Based on the results of this assessment, the project should be developed in a manner that ensures areas of ecological importance are retained and improved wherever practicable. Specifically, the following recommendations are made regarding site level planning:

- Avoid all direct and indirect impacts to watercourses and ephemeral drainages. This should include incorporation of a buffer of habitat to minimise disturbance impacts and water quality and flow impacts. The buffer distance should be determined based on habitat value and visibility in consultation with Melbourne water and/or the Catchment Management Authority. From an ecological perspective the buffer of watercourses and wetlands should be at least approximately 10 m 50 m as appropriate, and retention should be combined with reinstatement/rehabilitation of these areas.
- Although approval for clearance may be granted, consideration during operational phase should be given to retention of ecological values including high priority areas are higher quality understory, threatened ecological communities, large canopy trees, watercourses, indigenous revegetation, and habitat for threatened species. Consideration should also be given during the operational phase for clearance of the extraction area to be done gradually, or in stages, to reduce the 'initial loss' of habitat across the entire area approved for clearance. Refer to Staged clearing below.
- Provide for tree regeneration or recruitment around retained remnant trees.
- Utilise fauna-sensitive lighting measures to minimise light pollution.
- Develop a timber re-use plan for any trees which must be felled, with preference given to re-use of timber for habitat (hollows for arboreal habitat or logs for terrestrial habitat). Install habitat timber in suitable retained woodland habitat (i.e. within the remainder of the Mawson property to the east of the proposed quarry site).
- Maintenance or improvement of connectivity for fauna is recommended, particularly across the haul road by:
 - Maintaining earthen substrate for fauna such as frogs.
 - Designing culverts beneath roads in a way that provides for fauna that are likely to use these for dispersal.

Staged clearing

To further mitigate impacts, Mawsons are suggesting a staged clearing approach combined with planting vegetation across the broader property. Doing so will aim to minimise the loss of habitat for impacted species, specifically the Swift Parrot. Clearing for the quarry is proposed to occur in three stages being:

- Stage 1: Span from 0-15 years,
- Stage 2: Span from 15-30 years
- Stage 3: Span from 30-75 years.

Twelve ha of native vegetation is proposed to be cleared during the first 15 years of the quarry's life. Mawsons are proposing to establish over 30 ha of new vegetation within the broader property consisting of Swift Parrot key foraging tree species Yellow Box and Yellow Gum. These Eucalypt species reach maturity between 10-15 years. Therefore, they should provide a sufficient source of nectar to sustain Swift Parrots before Stage 2 commences and another eight hectares of land is cleared. By the time the final 16 hectares of land is cleared (Staged 3), planted trees would be almost 30 years old and well established.

Canopy revegetation - Swift Parrot

As mentioned in Section 6.2.3.4, it is anticipated that offsets will be achieved via a 1st party offset scenario in contiguous habitat. Within this there has been approximately 14 ha identified as suitable for revegetation with eucalypt canopy species – primarily Grey Box *Eucalyptus microcarpa* and White Box *Eucalyptus aberrans*. Areas identified for canopy revegetation have been ground-truthed to exclude areas currently recruiting eucalyptus, and shallow soils over granite. This revegetation is considered to significantly reduce the residual impacts of the proposed project to Swift Parrot, in terms of the species as a whole.

5.2 RECOMMENDED MITIGATION MEASURES

Although this project is in the early stages, measures to consider for construction have been included in this section of the report for early consideration.

Prior to, during and after construction, the mitigation process is typically managed through a Construction Environmental Management Plan (CEMP). A CEMP typically outlines all practicable measures to minimise and mitigate impacts on biodiversity from the construction and operational phase to the management and maintenance phases. The contractors will develop a CEMP that will include standard flora and fauna mitigation measures.

Prior to the commencement of any works, adequate briefing and induction of construction crews should occur to ensure that environmental values are given due consideration during construction.

5.2.1 Eco Logical Australia Recommendations (Eco Logical Australia, 2023c)

To minimise impacts resulting from the project, Eco Logical Australia recommended the following mitigation measures:

- An arborist assessment must be completed prior to construction. This would include an assessment to determine the TPZs to ensure encroachment to tree roots are avoided, and also to determine if additional construction mitigation measures are possible to minimise vegetation loss within the preferred haul road.
- Develop a vegetation management plan to be included in the site CEMP. This plan would include the following:
 - Significant areas of flora and fauna habitat are to be identified to ensure their protection.
 - Erect no-go zones and fences to prevent access to important areas.
 - Assess the project area prior to construction to confirm that retained vegetation and trees are protected from construction activities.
 - Measures required to protect vegetation.
 - Implementation of mitigation measures to decrease the risk of invasive species entering and establishing within the project area.
 - Unexpected finds protocol.
- Develop a fauna management plan to include in the site CEMP that details the following requirements:
 - A qualified ecologist or wildlife handler is to conduct pre-clearing inspections to confirm the location of fauna immediately prior to habitat removal and undertake any necessary relocation of salvaged fauna.
 - Daily inspections of trenches and open pits are to be conducted.
 - Managing displaced fauna in accordance with the Wildlife Act.
 - Light pollution should be kept at a minimum to limit impacts to nocturnal species, achieved by:
 - Installing light shields to direct light and reduce light spill.
 - Requiring vehicles to use low beam lights wherever practicable.

- A Site Environmental Management Plan to be prepared in areas where direct impacts to waterways are likely. This
 plan should cover:
 - Sediment and other deleterious substance controls
 - Remediation of waterways including bank stabilisation and riparian area revegetation.
 - Disinfecting protocol between aquatic sites to limit pathogen and pest spread.

5.2.2 Additional WSP Recommendations

Further to the above mitigation measures, WSP recommends these additional mitigation measures to manage the impacts of the project.

Additional flora mitigation

- Brief contractors regarding the protection of vegetation and habitat and the purpose for avoidance and minimisation.
- Select the appropriate type and size of machine so that disturbance and impact to tree roots of trees to be retained in proximity to works are minimised.
- All No-go Zones should be clearly labelled.
- Utilise the services of an arborist on site to minimise impact to trees and check off on TPZ fencing.
- Utilise the services of an ecologist to check off on any other vegetation and habitat No-go Zone fencing.

Additional fauna mitigation

- Where possible, works around waterbodies providing aquatic habitat should be scheduled outside of the nesting
 period of most bird species, and outside of the window in which migratory shorebirds are present in Australia (i.e.
 undertake clearing in Autumn-Winter where possible).
- If reinstatement of indigenous vegetation is to occur along watercourses, removal of exotic woody vegetation along watercourses should be somewhat staged, and coordinated with revegetation using indigenous woody species along watercourses.
- Appropriate fencing around the quarry to prevent the entry of ground dwelling fauna into the site.
- Consider the use of nest boxes in adjoining habitat to the east and north of the quarry to replace the hollows that will be lost as a result of the project.
- As mentioned is Section 5.1.2.2, clearance of native vegetation across the quarry to be gradual, or done in stages, to
 maximise existing habitat available to native fauna for as long as possible.

Additional environmental controls

- No dewatering of nearby watercourses, or release of water into them.
- No stockpiles or ground disturbance in proximity to watercourses.
- No stockpiles within TPZs or No-go Zones.
- Include waste management measures such as ensuring waste and recycling bins are located at all construction sites and break areas. Also include measures to avoid waste from construction materials entering the surrounding environment.
- Measures to avoid sediment-laden run-off and other pollutants entering waterways during the clearing and construction phase of the project in line with the Victoria EPA Principles of Best Practice Guidelines.

Additional weed and disease management

Prepare a contractor environmental hygiene manual (or follow an existing one) outlining the necessary actions
required to prevent weeds and diseases entering and/or leaving the site including:

- All machinery and vehicles should be free of weed propagules and/or material carrying potential diseases prior to commencement of work.
- If possible, begin work in areas close to native vegetation and move to areas dominated by introduced species or ensure machinery is thoroughly cleaned between sites.
- Where possible, avoid working at times of prolific seed set of noxious weeds to avoid their spread by machinery (generally summer for most of the noxious weeds present on site).

6 Legislation

This section addresses any permits, approvals, management plans and offset requirements that may be required for the project under federal, state and local government environmental legislation, following implementation of the specified mitigation measures and considering all works within the proposed project footprint.

6.1 COMMONWEALTH

6.1.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the Act as matters of national environmental significance (MNES). There are nine matters of national environmental significance to which the EPBC Act applies. These are:

- World heritage sites
- National heritage places
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- Listed threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

A 'significant impact' is defined under the EPBC Act as 'an impact that is important, notable, or of consequence, having regard to its context or intensity' (DoE, 2013). If a project is likely to have a significant impact on one of the nine MNES, the 'action' must be referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).

One MNES (Listed threatened species and communities) was identified as having a high risk of a significant impact as a result of the proposed project. This includes the following species and Threatened Ecological Community:

- Brown Treecreeper Climacteris picumnus (victoriae) Vulnerable
- Diamond Firetail Stagonopleura guttata Vulnerable
- Hooded Robin Melanodryas cucullata Endangered
- Southern Whiteface Aphelocephala leucopsis Vulnerable
- Swift Parrot Lathamus discolor Critically Endangered
- Grey Box Grassy Woodland and Derived Native Grassland of South-eastern Australia Endangered.

Assessment under the relevant significant impact criteria were completed for these species and Threatened Ecological Community according to the relevant criteria stipulated in *Matters of National Environmental Significance Significant impact guidelines 1.1* (Department of the Environment, 2013). The detailed assessments for each are provided in Appendix E and a summary is provided in Table 4.1. It is recommended that the action be referred to DCCEEW for potential implications under the EPBC Act.

6.2 STATE

6.2.1 Environment Effects Act 1978 (EE Act)

Under the *Environment Effects Act 1978*, projects that could have a 'significant effect' on Victoria's environment can potentially require an Environment Effects Statement (EES). This Act applies to any public works 'reasonably considered to have or be capable of having a significant effect on the environment'. The Minister for Planning is the responsible person for assessing whether this Act applies.

Before commencing any public works to which this Act applies, the proponent must initiate an EES to be prepared and submit it to the Minister for the Minister's assessment of the environmental effects of the works.

The triggering of an EES is dependent on the extent of impact within the project area and whether the impact triggers one or more of the referral criteria. A preliminary assessment based on the ecological aspects has been undertaken in accordance with the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Ministerial Guidelines) (DTP, 2023).

In order to undertake this assessment, a simple rating system was used to assess environmental aspects of the proposal against each EES Referral criterion outlined in the Ministerial Guidelines with commentary included to explain the basis for the assigned rating. The ratings were:

- Not applicable not applicable to an assessment of ecological values. Requires assessment by other disciplines.
- Criteria not met the proposal is unlikely to meet this criterion and would not trigger the need to submit a referral under the EES Act.
- Uncertain based on current information it is unclear whether the proposal would meet the criteria.
- Criteria met the proposal is likely to meet this criterion and may trigger the need for a referral.

The assessments are provided below in Table 6.1 – individual criteria, and Table 6.2 – combined criteria. Assessing against both individual and cumulative assessment criteria of the Ministerial Guidelines (DTP, 2023), one individual criteria, and potentially two combined criteria, are likely to be considered met. An EES may potentially be required by the Minister for Planning.

 Table 6.1
 Individual potential environmental effects – one criteria needs to be met to trigger a referral

INDIVIDUAL CRITERIA	RATIONALE
 Potential removal, destruction or lopping of 10 hectares or more of native vegetation, that consists of, or comprises a combination of: an ecological vegetation class (EVC) classified as endangered; or an EVC that is classified as vulnerable (with a condition score of 0.5 or more) or rare (with a condition score of 0.6 or more); and 	Criteria not met Three patches of native vegetation were mapped within the project area totalling 36.884 ha. Of these, two patches totalling 2.603 ha [^] , were most attributable to an endangered EVC — Plains Woodland EVC 803. The remainder of the anticipated impacts (34.281 ha) include native vegetation attributable to Hillcrest Herb-rich Woodland EVC 70 which is classified as a depleted EVC in the Goldfields Bioregion.
 that is not authorised for removal under an approved forest management plan or fire protection plan. 	[^] These area calculations are exclusive of Scattered Trees which are accounted for as an area – as per the Guidelines
Potential clearing of an area determined as 'critical habitat' under the <i>Flora and Fauna</i> <i>Guarantee Act 1988</i> .	Not assessed To date, no Critical Habitat Determinations have been produced in Victoria (refer to Section 6.2.2.3 for more detail). However, it is possible the proposed quarry site may be considered critical habitat for Small-flower Wallaby-grass given the limited habitat available for this species across the state (see below).

INDIVIDUAL CRITERIA	RATIONALE		
Potential for loss of a significant proportion (e.g.	Criteria met		
1% or greater) of known remaining habitat or population of a threatened species within Victoria	A total of six flora and 15 fauna species listed under the FFG Act were identified as occurring or considered moderate or highly likely to occur (refer to Table 3.8 and Table 3.9).		
	Small-flower Wallaby-grass		
	Small-flower Wallaby-grass was identified in large numbers within the proposed quarry site by both Eco Logical Australia and WSP ecologists. A comparison of the proposed area of impact (36.884 ha) to the species Habitat Importance Map (HIM) (DEECA, 2023) identified that the proposed project could impact a significant proportion (approximately 1.6%) of known habitat for Small-flower Wallaby-grass (FFG Act listed endangered).		
	Other FFG Act species		
	For the remaining 20 FFG Act listed species, it is unlikely that the anticipated vegetation loss of 36.884 ha associated with the project will result in the loss of 1-5% of known remaining habitat or populations of those species.		
sPotential for long-term change to the ecological	Criteria not met		
character of a wetland listed under the Ramsar Convention or in <i>A Directory of Important</i> <i>Wetlands in Australia</i> .	Five Wetlands of International Importance (Ramsar Wetlands) were returned in the PMST report. However, it is highly unlikely that the project will result in long- term change to any of these Ramsar sites due to their proximity from the project area.		
	Furthermore, there are no wetlands listed under the <i>Directory of Important</i> <i>Wetlands in Australia</i> located near the project area.		
Potential for extensive or major effects on the use	Uncertain		
and environmental values of water resources due to changes in water quality, water availability	Waterways		
stream flows, water quanty, water availability, stream flows, water system function, or regional groundwater levels, or the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term.	The haul road is within 50 m of a watercourse located along Bridgewater-Maldon Road, and also crosses another creek line in the middle of the alignment. Both watercourses are degraded and don't flow with water frequently (Eco Logical Australia, 2023c).		
	There are several other mapped watercourses that intersect the project area, including a farm dam in the top north-west corner of the quarry which provides drinking water for fauna, especially birds, and habitat for common frogs (Eco Logical Australia, 2023a). Note that many of the mapped watercourses within the quarry site are ephemeral waterways that did not contain water at the time of WSP's assessment.		
	Providing the implementation of appropriate mitigation measures to reduce the risk of sedimentation, run-off and erosion, the project is unlikely to have extensive impacts on the environmental value of these waterways.		
	Groundwater Dependent Ecosystems		
	The proposed quarry site is both coincident and adjacent to high potential terrestrial and aquatic Groundwater Dependent Ecosystems (GDEs) (Eco Logical Australia, 2023c). Detailed assessments indicated that excavation associated with the quarry site may result in local groundwater drawdown up to 100 m locally, potentially having some level of impact on local GDEs. Additional observation of the groundwater table and numerical groundwater modelling may be required to determine the extent of potential impacts (Eco Logical Australia, 2023c).		

INDIVIDUAL CRITERIA	RATIONALE
Potential for extensive or major effects to human health or the environment, or displacement of residents, from pollution or waste emitted to air, land, water or groundwater.	Not assessed
Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility.	Not assessed

 Table 6.2
 Combined potential environmental effects – two or more need to be met to trigger a referral

COMBINED CRITERIA	RATIONALE
Potential removal, destruction or lopping of 10 hectares or more of native vegetation, unless it is authorised for removal under an approved forest management plan or fire protection plan.	Criteria met The proposed project is anticipated to impact a total of approximately 36.884 ha of native vegetation comprising; — 34.281 ha of Hillcrest Herb-rich Woodland (Depleted) — 2.603 ha of Plains Woodland (Endangered) ^ These area calculations are exclusive of Scattered Trees which are accounted for as an area – as per the Guidelines.
Matters listed under the FFG Act: — potential loss of a significant area of a listed	Uncertain One FFG Act listed threatened community (VTWBC) was recorded and mapped
 potential loss of a significant act of a lister ecological community; or potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including from loss or fragmentation of habitats; or potentially significant effects on habitat values of a wetland supporting migratory bird species. 	across all native vegetation patches within the project area. Anticipated impacts to this threatened community as a result of the proposed works is approximately 36.884 ha. This area of loss may be considered significant, however there is a lack of guidance as to what is deemed to be a 'significant area' of loss for FFG Act listed threatened communities. To date, no Critical Habitat Determinations have been produced in Victoria (refer to Section 6.2.2.3 for more detail). However, it is possible that the proposed quarry may be considered critical habitat for Small-flower Wallaby-grass given the limited habitat available for this species across the state (refer to Section 6.2.2.3).
	It is unlikely that the project would result in loss of a genetically important population, or the loss of critical habitat, for any of the other FFG Act listed species that have been recorded or are likely to occur in the area.
 Potential for extensive or major effects on landscape values of regional importance, especially: where recognised by a planning scheme overlay; declared as a distinctive area and landscape under the <i>Planning and</i> <i>Environment Act 1987</i>; or within or adjoining land reserved under the <i>National Parks Act 1975</i>. 	Not assessed
Potential for extensive or major effects to the environment due to changes in land stability, disturbance of acid sulphate soils or project- induced soil erosion over the short or long term.	Not assessed

COMBINED CRITERIA	RATIONALE
Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities.	Not assessed
Potential for extensive displacement of residents or severance of residents' access to their community resources.	Not assessed
Potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions.	Not assessed
Potential for extensive or major effects on Aboriginal cultural heritage values protected under the <i>Aboriginal Heritage Act 2006</i> .	Not assessed
Potential for extensive or major effects on cultural heritage places and sites listed on the Victorian Heritage Register or the Victorian Heritage Inventory under the <i>Heritage Act 2017</i> .	Not assessed

Based on the results, an EES referral is likely required due to potential impacts to native vegetation (including an FFG Act listed ecological community) and potential impacts to FFG Act listed species, namely Small-flower Wallaby-grass. It is worth noting that there are other referral triggers that will need to be considered, however these are beyond the scope of an ecology assessment (e.g. social, economic, emissions, etc).

6.2.2 Flora and Fauna Guarantee Act 1988 (FFG Act)

The Victorian FFG Act was established to provide a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna, and to enable management of potentially threatening processes. FFG Act listed species and communities which occur, or are likely to occur in the project area, are detailed in Section 4.2.

6.2.2.1 Listing of species and communities

One of the main features of the FFG Act is the listing process, whereby native species and communities of flora and fauna, and the processes that threaten native flora and fauna, are listed in the schedules of the Act. This assists in identifying those species and communities that require management to survive and identifies the processes that require management to minimise the threat to native flora and fauna species and communities within Victoria.

The permit requirement under Section 47 of the FFG Act does not apply to most of the FFG Act listed biodiversity values recorded within the project area, as they occur on private land. Therefore a 'permit to take' is not required under the FFG Act for the removal of these species. The exception is two Late-flower Flax-lily (FFG Act listed threatened) that occur within the haul road alignment along Stones Road. A Permit under Section 47 of the FFG Act will be required for their removal. A Permit under Section 47 of the FFG Act will also apply to removal of VTWBC along Bridgwater-Maldon Road and Stones Road.

6.2.2.2 Protected flora

Under the FFG Act, a permit from DEECA is required to 'take' (to kill, injure, disturb or collect) flora species that are members of protected taxa from public land. This does not apply to private land unless listed species are present and the land is declared 'critical habitat' for the species, or the species to be impacted on private land are aquatic. Protected flora include:

Protected flora are:

- plants that have been declared to be protected under section 46 of the FFG Act
- plants that are listed as threatened under section 10 of the FFG Act
- plants that belong to communities that are listed as threatened under section 10 of the FFG Act.

The Declared Protected Flora List was updated on 16 May 2024 (DEECA, 2024b). Two categories are required to be considered:

- Restricted use protected flora.
- Protected flora other than restricted use protected flora (i.e. Generally Protected Flora).

Restricted use protected flora are exclusively threatened by take for commercial/personal use, and the taking of these species incidental to clearing for development works is not restricted (as long as reasonable care is taken not to impact the taxon) and will not require a permit to take. Generally protected flora are threatened by take for reasons other than or additional to commercial/personal use (e.g. development clearing) and will require a permit to take for any purpose.

A total of 13 FFG Act protected flora species were recorded during the WSP site assessment. Three of these are varieties of orchids which are listed as 'Generally protected flora'. However they were recorded within the proposed quarry site which is situated on private land. Therefore, a 'permit to take' is not required for their removal. As the remaining ten listed protected flora species are listed as 'restricted use protected flora' (DEECA, 2024b), a 'permit to take' is also not required under the FFG Act for their removal. Reasonable care must be taken to avoid and minimise impacts to these taxa.

6.2.2.3 FFG Act critical habitats

The *Flora and Fauna Guarantee Amendment Act 2019* expands the concept of critical habitat in the FFG Act and provides an inclusive list of factors which may contribute to an area being critical habitat. Critical habitats are areas determined under the FFG Act which make a significant contribution to the conservation of listed threatened species or communities. They may also include areas that support ecological processes or ecological integrity that significantly contribute to the conservation of listed species or communities. They can be on public or private land (DELWP, 2020).

Regulatory protection of critical habitat is provided by Habitat Conservation Orders (HCO). HCOs may be made by the Minister to conserve, protect or manage critical habitat. HCOs can prohibit damage to critical habitat or require remediation of previous damage (DELWP, 2020).

To date, no Critical Habitat Determinations have been produced in Victoria. However, it is possible that habitat for Small-flower Wallaby-grass within the proposed quarry site may be considered critical habitat for this species. Small-flower Wallaby-grass is rare in Victoria but occurs in dryish grassy woodland, mainly through central and north-eastern Victoria (e.g. Ararat, Warby Range), but with isolated occurrences in the far east. The species' Habitat Importance Map (HIM) identified that only 2,251 ha of suitable habitat remains for this species within the state (DEECA, 2023). Whilst the VBA has only three records of this species within a 10 km radius of the project area (DEECA, 2024d), Eco Logical Australia recorded a total of 241 individuals during their assessment (Eco Logical Australia, 2023a) and WSP recorded 193 individuals within the proposed quarry site, plus two more just outside the proposed quarry boundary. Given this, it is possible that if this area is to be impacted, a HCO may be made by the State Minister for Environment.

It is unlikely any other habitat across the project area would be considered critical habitat for any of the remaining FFG Act listed flora and fauna species recorded or considered likely to occur within the project area.

6.2.3 Planning and Environment Act 1987 (P&E Act)

The P&E Act provides the legal framework for the operation of Victoria's planning system, commonly referred to as *the Planning Scheme*. Sections of the Mount Alexander Planning Scheme of relevance to ecological matters are brought about by Clause 12.01-1s, 12.01-1L and 12.01-2S, and subsequently Clause 52.17.

The objective of Clause 12.01-2S is to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This clause calls for policy documents to be considered as relevant:

- Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017c) (the Guidelines).
- *Assessor's handbook applications to remove, destroy or lop native vegetation* (DELWP, 2018) (the Assessors handbook).

Clause 52.17 of the Mount Alexander Planning Scheme requires a permit for the clearance of native vegetation as per the Guidelines, and consideration given to the three-step approach of *avoidance, minimisation* and *offsetting* of native vegetation clearance.

6.2.3.1 Planning Zones

The majority of the project area is zoned Farming Zone (FZ), except for a small area where Stones Road intersects with Bridgewater-Maldon Road which is zoned Principal Road Network (TRZ2). There are no relevant permit requirements associated with these zonations.

6.2.3.2 Planning Overlays

There are two planning overlays across the project area, Erosion Management Overlay (EMO), and Bushfire Management Overlay (BFM). Of these, the *EMO clause 44.01-3 – Vegetation removal* has ecological significance (see below). There are no Environmental Significance Overlays or Vegetation Protection Overlays across the project area.

EMO - Erosion Management - Vegetation Removal

Statement of environmental significance

Erosion and sedimentation can result in the movement of deleterious substances into waterways and flora being covered. This overlay aims to protect areas prone to erosion, by minimising land disturbance and inappropriate development.

Environmental objective to be achieved

- Prevent erosion, landslips or land degradation
- Prevent movement of soils
- Protect land from degradation.

Permit requirements

- To remove vegetation if the works is exempted under Clause 44.01-4.

6.2.3.3 Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines)

The Guidelines (DELWP, 2017c) have been designed to manage the risk to Victoria's biodiversity associated with the removal of native vegetation. The Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria under the *Planning and Environment Act 1987*.

Assessment Pathway

The assessment pathway determines the information that accompanies an application and the decision guidelines that are considered in determining the outcome of an application (DELWP, 2017c). The assessment pathway for an application to remove native vegetation reflects its potential impact on biodiversity and is determined from the location and extent of the native vegetation to be removed. The three assessment pathways are:

- 1 Basic limited impacts on biodiversity.
- 2 Intermediate could impact on large trees, endangered EVCs, and sensitive wetlands and coastal areas.

3 Detailed – could impact on large trees, endangered EVCs, sensitive wetlands and coastal areas, and could significantly impact on habitat for rare or threatened species.

The assessment pathway of an application is determined in accordance with Table 6.3.

Extent	Location Category			
	Location 1	Location 2	Location 3	
<0.5 hectares and not including any large trees	Basic	Intermediate	Detailed	
<0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed	
\geq 0.5 hectare	Detailed	Detailed	Detailed	

Source: Guidelines for the removal, destruction or lopping of native vegetation (DELWP, 2017c)

Impacts to native vegetation associated with the project intersect Location 2 and total ≥ 0.5 hectares. The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the state-wide EVC map) and could result in the removal of large trees and significantly impact on habitat for rare or threatened species. Therefore, vegetation removal will follow a Detailed Assessment Pathway.

All assessment pathways

Application requirements for all applications for a permit to remove native vegetation involve the following:

- 1 Information about the vegetation to be removed including:
 - a the assessment pathway and reason for the assessment pathway. This includes the location category of the native vegetation to be removed. See paragraph above.
 - **b** a description of the native vegetation to be removed accounted for as per the Guidelines see section 4.3.
 - c Maps showing the native vegetation and property in context and vegetation to be removed as accounted for by the Guidelines. See Appendix A.
 - d the offset requirement, determined in accordance with the Guidelines. See Section 6.2.3.4.
- 2 Topographic and land information relating to the native vegetation to be removed.
- 3 Recent, dated photographs of the native vegetation to be removed. See section 3.2.7.
- 4 Details of any other native vegetation approved to be removed, or that was removed without the required approvals within 5 years of the permit application. Not applicable.
- 5 An avoid and minimise statement. See Section 5.1
- 6 An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified, and can be secured in accordance with the Guidelines.

Native Vegetation Removal Report

A Native Vegetation Removal (NVR) report was generated to determine the impacts and offset requirements associated with the project. The NVR report indicates that potential total impacts (including the scattered tree) equate to an extent of 36.954 ha, as per NVR report data standards (DELWP, 2017b). Associated offset requirements are detailed in Table 6.4 below and provided in full in Appendix F. The NVR report will be used to officiate clearance and offset requirements.

Table 6.4 Summarised vegetation clearance calculations and offset requirements as per the NVR report

VEGETATION CLEARANCE	
Assessment pathway	Detailed Assessment Pathway
Location category	Location 2

	The native vegetation extent map indicates that this area is typically characterised as supporting native vegetation. Additionally, it is modelled as encompassing an endangered Ecological Vegetation Class, sensitive wetland or sensitive coastal area. The removal of less than 0.5 hectares of native vegetation in this area will not require a Species Offset.		
Total extent including past and proposed removal (ha)	36.954	Extent of past removal (ha)	0
		Extent of proposed removal – Patches (ha)	36.884
		Extent of proposed removal – Scattered Trees (ha)	0.070
No. Large Trees proposed to be removed	73	No. Large Patch Trees	72
		No. Large Scattered Trees	1
No. Small Scattered Trees	0		
OFFSET REQUIREMENTS (IF APPROVAL IS GRANTED)			
General offset amount ¹	Nil		
Vicinity	NA		
Minimum strategic biodiversity value score ²	NA		
Large trees*	Nil		
Species Offset amount ³	 49.984 Species Habitat Units for Grey Falcon, <i>Falco hypoleucos</i> (10236) 46.882 Species Habitat Units for Swift Parrot, <i>Lathamus discolor</i> (10309) 49.315 Species Habitat Units for Ausfeld's Wattle, <i>Acacia ausfeldii</i> (500013) 49.157 Species Habitat Units for Cottony Cassinia, <i>Cassinia ozothamnoides</i> (501560) 49.157 Species Habitat Units for Flat-leaf Bush-pea, <i>Pultenaea platyphylla</i> (502865) 49.315 Species Habitat Units for Cane Spear-grass, <i>Austrostipa breviglumis</i> (503268) 49.294 Species Habitat Units for Cobberas Grevillea, <i>Grevillea brevifolia</i> (505489) 49.160 Species Habitat Units for Sutton Grange Greenhood, <i>Pterostylis agrestis</i> (507734) 52.511 Species Habitat Units for Eltham Copper, <i>Paralucia pyrodiscus lucida</i> (65003) 		
Large trees*	73 large trees		
* The total number of large trees that the offset must protect	73 large trees		

Source: NVR report dated 21/10/2024 – NVRR ID 353_20241021_C9S

¹ The general offset amount required is the sum of all General Habitat Units in Appendix 1 (of the NVR report)

² Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a General Offset is required

³ The Species Offset amount(s) required is the sum of all Species Habitat Units in Appendix 1 (of the NVR report).

6.2.3.4 Offset requirements

The offset target for clearance of all vegetation across the project area is 73 Large Trees and nine Species Habitat Units. Generally, Species Habitat Units are not readily available, if at all. Species Habitat Units may need to be created if required. However, preliminary offset investigations and NVR report testing indicate it is possible the proponent can achieve the required Species Habitat Units via a first-party offset scenario with habitat contiguous with the impact area.

6.2.3.5 Avoid and Minimise

The three-step approach (avoid, minimise, offset) is the key policy in relation to the removal of native vegetation to achieve no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. It is a precautionary approach that aims to ensure that the removal of native vegetation is restricted to only what is reasonably necessary, and that biodiversity is appropriately compensated for any removal of native vegetation that is approved (DELWP, 2017c).

The assessors' handbook (DELWP, 2017a) calls for the avoidance and minimisation statement to describe:

- any strategic level planning over the site,
- what site level planning has been done,
- that no feasible opportunities exist to further avoid and minimise impacts on native vegetation without undermining the key objectives of the proposal.

Recommendations for avoidance and minimisation of impacts are provided in Section 5.1.

6.2.4 Water Act 1989

The Victorian *Water Act 1989* provides the framework for allocating surface water and groundwater throughout Victoria. Section 67 states that work on waterways, such as the construction of dams, weirs and erosion control structures, are licensed in accordance with the Water Act. The Act allows conditions to be included in a works licence to protect the "environment, including the riverine and riparian environment".

A key purpose of the Water Act is to "provide formal means for the protection and enhancement of the environmental qualities of waterways".

Under the Act, approval must be sort from the North Central Catchment Management Authority (CMA) and a "Works on Waterways Permit" is required to construct, alter, operate, remove or decommission any works on a waterway, including works to deviate (temporarily or permanently) a waterway, or a bore.

The haul road is located within 50 metres of a watercourse situated along Bridgewater-Maldon Road, and also crosses another creek line in the middle of the alignment. Both watercourses are degraded and don't flow with water frequently (Eco Logical Australia, 2023c). There are several other mapped watercourses that intersect the project area, including a farm dam in the top north-west corner of the quarry which provides drinking water for fauna, especially birds, and habitat for common frogs (Eco Logical Australia, 2023a). Note that many of the mapped watercourses within the quarry site are ephemeral waterways that did not contain water at the time of WSP's assessment.

Providing the implementation of appropriate mitigation measures to reduce the risk of sedimentation, run-off and erosion, the project is unlikely to have extensive impacts on the environmental value of these waterways.

6.2.5 Wildlife Act 1975

The *Wildlife Act 1975* is a key piece of legislation in Victoria for the protection of wildlife. The Act requires that wildlife research, including fauna salvage and relocation, is regulated through a permit system, which is managed by DEECA.

Authorisation for fauna removal/relocation must be obtained under the *Wildlife Act 1975* through a licence granted by DEECA. Any persons involved in fauna removal, salvage capture or relocation of fauna during mitigation measures must hold a current management authorisation under the *Wildlife Act 1975*.

During construction, pre-clearing survey and clearance monitoring (including salvage and relocation) is recommended for any areas of key habitat which are proposed to be impacted. This should include all large trees, shrubby vegetation, and wetland areas (i.e. the dam). The qualified and experienced ecologist undertaking this work much have a current management authorisation under this Act.

6.2.6 Catchment and Land Protection Act 1994

6.2.6.1 Declared noxious weeds

The project area supports several weeds that are declared noxious under the *Catchment and Land Protection (CaLP)* Act 1994. Plants occurring on this list are known to, or have the potential to, result in detrimental environmental and/or economic impact. Under the CaLP Act, declared noxious weeds are categorised into four groups depending on their known and potential impact and specific circumstances for each region. These categories are:

- State Prohibited Weeds (S)
- Regionally Prohibited Weeds (P)
- Regionally Controlled Weeds (C)
- Restricted Weeds (R)

The field survey conducted by WSP recorded two Regionally Controlled weeds within the project area: Common Prickly-pear **Opuntia stricta* and Golden Thistle **Scolymus hispanicus*.

In addition, surveys undertaken by Eco Logical Australia identified two Regionally Controlled weeds, Horehound **Marrubium vulgare* and Wheel Cactus **Opuntia robusta*, as well as two Restricted weeds, Saffron Thistle **Carthamus lanatus* and Spear Thistle **Cirsium vulgare* (Eco Logical Australia, 2023c). It is worth noting that the exact location of the CaLP Act listed weeds recorded by Eco Logical Australia is unknown and some may have been recorded within the alternative haul road option areas that were investigated at the time (i.e. areas not relevant to this assessment). However, for completeness, they have been included in this report.

Regionally Controlled weeds are usually widespread, but it is important to prevent their further spread. It is the responsibility of the landowner to control these weeds on their property and on adjacent roadside reserves. Restricted weeds are considered to be a serious threat to primary production, Crown land, the environment and/or community health if they were traded in Victoria.

Measures to control both noxious weeds and pest animals during construction must be included within a CEMP.
7 Conclusion & recommended next steps

WSP Australia Pty Ltd (WSP) was engaged by E.B. Mawson & Sons Pty. Ltd. (Mawsons) to progress the ecological impact assessment and approvals documentations for the proposed ~36 hectares (ha) Blue Hills Quarry, and associated haul road (the Project) in Bradford, Victoria.

Several previous ecological and impact assessment reports have been prepared by various consultants. This report was prepared in addition to, and supported by, previous assessments undertaken in 2021, 2022 and 2023 on the proposed quarry area and haul road alignment.

The project has the potential to impact on numerous threatened flora and fauna species, and ecological communities listed under the EPBC Act and FFG Act.

Implications under ecologically relevant legislation are anticipated, including:

- 1 A referral of the project (or 'action') has a high risk of significant impacts to MNES listed under the EPBC Act.
- 2 Assessing against both individual and cumulative assessment criteria of the Ministerial Guidelines (DTP, 2023), one individual criteria, and potentially two combined criteria, are likely to be considered met. An EES may potentially be required by the Minister for Planning under the EE Act
- 3 The project is likely to require onerous species offsets to satisfy clause 52.17 requirements under the P&E Act.

Recommended next steps

- Engage an arborist to undertake a detailed arborist impact assessment to determine the retention potential of all trees around /outside the project area.
- Upon completion of the arborist assessment, the NVR report should be updated to reflect any additional impacts to trees located outside, but near the project area boundary.
- All recommendations to minimise and mitigate impact provided in section 5 should be incorporated into project planning and design.
- It is recommended this project be referred to DCCEEW for likely significant impacts to MNES
 - It is recommended that referral documentation be drafted and approved by the proponent.
 - It is recommended that a pre-referral meeting be arranged with DCCEEW following drafting of referral.
- It is recommended this project be referred to the Minister for Planning to assess the potential requirement for an EES. Consultation with the impact assessment unit of Department of Transport and Planning (DTP) should be undertaken to:
 - Organise a pre-referral meeting to provide an overview of the project and associated ecological effects.
 - Discuss the suitability of this documentation, to support an EES if required.
 - Investigate the potential of a bilateral agreement for assessment.
- State and Federal offset investigations should be progressed to further understand feasibility of achieving all
 potentially required offsets. It is recommended this be progressed in the form of an offset strategy.

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Appendix A Maps















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PS134125 Mawson Quarries - Blue Hills

Figure A.4 Native Vegetation

Legend

			I
	-	-	

Project Area

Impact 20 m buffer

FFG Act Listed Community



EPBC Act Threatened Ecological Community

Grey Box Grassy Woodlands

Ecological Vegetation Class

- Hillcrest Herb-rich Woodland
- Plains Woodland

Trees





Impacted







PS134125 Mawson Quarries - Blue Hills

Figure A.4 Native Vegetation

Legend



Trees



Not Imapcted





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PS134125 Mawson Quarries - Blue Hills

Figure A.4 Native Vegetation

Legend

Project Area

FFG Act Listed Community



Victorian Temperate Woodland Bird Community

EPBC Act Threatened Ecological Community

Grey Box Grassy Woodlands

Ecological Vegetation Class

Plains Woodland

Trees



Impacted



Appendix B Likelihood of Occurrence



B1 Likelihood of Occurrence Assessment - Flora

Table B.1 Likelihood of occurrence table – flora

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVAT	TION STATUS			HABITAT DESCRIPTIONS	
NAME			EPBC ACT	FFG ACT	3161111103	RECORD		OCCORRENCE
Allocasuarina luehmannii	Buloke	VBA		cr	6	5/01/2013	Usually growing in woodland with <i>Eucalyptus microcarpa</i> , on non-calcareous soils.	Recorded – Two saplings were recorded by WSP ecologists within the north- west corner of the proposed quarry site. Previous assessments undertaken by Eco Logical Australia also recorded two Bulokes (Eco Logical Australia, 2023a).
Amphibromus fluitans	River Swamp Wallaby-grass	VBA PMST	VU		1	31/12/1995	Largely confined to permanent swamps, principally along the Murray River between Wodonga and Echuca, uncommon to rare in the south (e.g. Casterton, Moe, Yarram), probably due to historic drainage of wetlands.	Low - no suitable habitat to support this species and species was not recorded by Eco Logical Australia during targeted surveys (Eco Logical Australia, 2023a).
Amyema linophylla subsp. orientalis	Buloke Mistletoe	VBA		cr	1	12/11/1999	Widespread in western Victoria but scarce due to the depletion of its main host plant Buloke.	Low - Not recorded growing in Buloke within the quarry area. The low number of host trees present results in low recruitment opportunities for this species.

		SOURCE	CONSERVATION STATUS		COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCEown only from try and Big Desert, grassland at ToolernLow - no suitable habitat to support this species.
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Austrostipa hemipogon	Half-bearded Spear- grass	VBA		vu	1	8/09/2014	Relatively rare in Victoria and known only from Mallee-scrubs in the Sunset Country and Big Desert, from woodland near Stawell, and grassland at Toolern Vale near Bacchus Marsh.	Low - no suitable habitat to support this species.
Austrostipa trichophylla	Spear-grass	VBA		en	1	12/04/2011	Species is relatively rare in Victoria, only known from scattered sites in the west and north-west (Little Desert, Black Range near Stawell, Wedderburn, Gunbower, Ouyen, Mildura areas) where it occurs in mallee and woodland formations.	Low - no suitable habitat to support this species.
Ballantinia antipoda	Southern Shepherd's Purse	VBA	EN	cr	2	19/08/1999	Species was presumed to be extinct until recently re- discovered in 1983 on Mt Alexander, near Castlemaine in Central Victoria. Previous records indicate the species occurred in stony or rocky areas on the volcanic plains south-west of Melbourne and on low granite hills and mountains, including Mount Emu, Mount Cole, Mount Langi Ghiran and Mount Buangor in western Victoria where it would grow on moss mats on seepage areas in open habitats.	Low – Species likelihood downgraded from moderate to low based on the absence of this species during surveys combined with the lack of specific habitat features within the project area.
Caladenia audasii	McIvor Spider- orchid, Audas' Spider-orchid	PMST	EN	cr			Endemic to Victoria where known only from the west and central goldfields in woodland on shallow stony soils.	Low - Species was not recorded by Eco Logical Australia during targeted surveys (Eco Logical Australia, 2023a) and the habitat within the project area is not considered suitable to support this species without management (i.e. protection from grazing).

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVAT	TION STATUS		OF NGS LAST RECORDHABITAT DESCRIPTIONSLIKELIHOOD OCCURRENCEImage: Stress of the state in the south-west in heathy forest on seasonally moist 		
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Caladenia ornata	Ornate Pink Fingers	PMST	VU	en			Apparently endemic to Victoria where known only from the south-west in heathy forest on seasonally moist sandy loam.	Low - no previous records in 10km radius
Caladenia tensa	Greencomb Spider- orchid, Rigid Spider- orchid	PMST	EN				In Victoria found mainly in the Little Desert area (also with an isolated record for near Wood Wood) in Eucalyptus/Callitris woodland on well-drained sandy soil.	Low - no previous records in 10km radius
Caladenia versicolor	Candy Spider-orchid	PMST	VU	en			Restricted to the western part of the Midlands region in the vicinity of Stawell, in woodland on winter-wet sandy loam.	Low - no previous records in 10km radius
Cullen tenax	Tough Scurf-pea	VBA		en	1	28/01/1991	In Victoria it is usually found growing in drier parts of the state in grassland and grassy woodland environments on heavy soils.	Low - lack of abundant and recent records in the area.
Dianella amoena	Matted Flax-lily	PMST	EN	cr			Occurs mainly in lowland grasslands, grassy woodlands, valley grassy forest and creeklines of herb- rich woodland.	Low - no previous records in 10km radius
Dianella tarda	Late-flower Flax-lily	VBA		cr	5	24/09/2015	On clayey or loam soils, mostly on floodplains, often in Eucalyptus camaldulensis riverine forest or woodland.	Recorded - Species was recorded outside of the project area within native vegetation along Murphey's Road and Bridgewater-Maldon Road (Eco Logical Australia, 2023c)

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVAT	TION STATUS			HABITAT DESCRIPTIONS	
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Diuris behrii	Golden Cowslips	(Eco Logical Australia, 2023a)		en	2	2022	Species is locally common in grassland and open woodland mostly in western Victoria.	Recorded – Two fruiting bodies were observed during the preliminary survey which appear to be from this species. A precautionary approach has been adopted in determining this species presence at the site (Eco Logical Australia, 2023a)
Dodonaea procumbens	Trailing Hop-bush	PMST	VU				Largely confined in Victoria to the south-west (Penola- Dergholm area, Grampians, Lake Fyans) with outlying occurrences near Castlemaine, Avoca, Skipton, Camperdown and extraordinary disjunctions near Sale and also in the upper Murray River area. Grows in low- lying, often winter-wet areas in woodland, low open- forest and grasslands on sands and clays.	Low - Species was not recorded by Eco Logical Australia during targeted surveys (Eco Logical Australia, 2023a) and there are no previous records in 10km radius.
Elacholoma prostrata	Small Monkey- flower	VBA		en	2	21/02/2012	Confined to north-western and north-central areas of the State where it grows on heavy soils prone to seasonal inundation such as gilgais and floodplains.	Low - no suitable habitat to support this species.
Glycine latrobeana	Clover Glycine	VBA PMST	VU	vu	1	23/11/2011	Widespread but of sporadic occurrence and rarely encountered. Grows mainly in grasslands and grassy woodlands.	Low – Species likelihood downgraded from moderate to low. Targeted surveys undertaken by WSP botanists failed to detect the species. Given this and the lack of previous records within the area, the species is considered unlikely to occur within the project area.

SCIENTIFIC	COMMON NAME	SOURCE	CONSERVATION STATUS			COUNT OF	COUNT OF	COUNT OF	COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCEIn the urlington westLow - no previous records in 10km radiusavy clay soil cords near theLow - no previous records in 10km radiusrn quarter of soils nearLow - no previous records in 10km radiusections from Streatham, tions were Brampians andLow - no previous records in 10km radiuswestern ing in s and rockLow - no previous records in 10km radius
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE				
Lachnagrostis adamsonii	Adamson's Blown- grass, Adamson's Blowngrass	PMST	EN	en			Occurs in and around saline depressions on the Volcanic Plain where recorded from Portarlington west almost to the South Australian border.	Low - no previous records in 10km radius				
Lepidium aschersonii	Spiny Peppercress	PMST	VU	en			Typically found on Volcanic Plains on heavy clay soil near salt lakes. There are some outlying records near the Grampians and Lake Omeo.	Low - no previous records in 10km radius				
Lepidium monoplocoides	Winged Pepper-cress	PMST	EN	en			Uncommon occurrence in the north-western quarter of Victoria where it mostly grows on heavy soils near lakes and watercourses.	Low - no previous records in 10km radius				
Leucochrysum albicans subsp. tricolor	Hoary Sunray, Grassland Paper- daisy	PMST	EN	en			Very rare in Victoria, the only recent collections from roadside verges near Wickliffe, Willaura, Streatham, Inverleigh and Creswick. All other collections were gathered last century, from Mt Cole, the Grampians and the Port Fairy district.	Low - no previous records in 10km radius				
Myriophyllum porcatum	Ridged Water- milfoil	PMST	VU	cr			Rare and restricted to northern and north-western Victoria where it has been recorded growing in temporary waterholes, lagoons, farm dams and rock holes, and on clay pans.	Low - no previous records in 10km radius				
Pimelea spinescens subsp. spinescens	Spiny Rice-flower	VBA PMST	CR	cr	7	17/04/2015	Grows in grassland, open shrubland and occasionally woodland, often on basalt-derived soils. Mostly west of Melbourne (to near Horsham), but extending as far north as Echuca.	Low - previous assessment by Habitat Management Services determined there was no suitable habitat to support this species (Habitat Management Services, 2021)				
Prasophyllum validum	Sturdy Leek-orchid, Mount Remarkable Leek-orchid	PMST	VU				Apparently endemic to Victoria where scattered across northern, north-eastern (Chiltern area) and western open forest and woodland communities on stony and sandy soils.	Low - no previous records in 10km radius				

	COMMON NAME S	SOURCE	CONSERVATION STATUS	STATUS COUNT OF	LAST	HABITAT DESCRIPTIONS	FIONSLIKELIHOOD OF OCCURRENCEhere confined to basalt plains ty of Bacchus Marsh, Maldon, e and possibly Woorndoo.Low - no suitable habitat to support this species.Victoria, but exact range ion with closely allied species. f heathy and shrubby forest, on on shallow soil among emergent rocks.Low - no previous records in 10km radiusSay woodland sites between on shallow soil among emergent n.Low - lack of abundant and recent records in the area.Don granite hills, particularly in near Beechworth, with disjunct n.Low - despite species being known to occur in the local area it was not recorded during any of the assessments or targeted surveys that have been undertaken (Eco Logical Australia, 2023c).basaltic grasslands between rne where endangered due toLow - no previous records in 10km radius	
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Pterostylis agrestis	Sutton Grange Greenhood	VBA		cr	4	5/10/2008	Endemic to Victoria where confined to basalt plains grasslands in the vicinity of Bacchus Marsh, Maldon, Sutton Grange, Taradale and possibly Woorndoo.	Low - no suitable habitat to support this species.
Pterostylis chlorogramma	Green-striped Greenhood	PMST	VU	en			Apparently localized in Victoria, but exact range uncertain due to confusion with closely allied species. Grows in moist areas of heathy and shrubby forest, on well-drained soils.	Low - no previous records in 10km radius
Pterostylis valida	Robust Greenhood	VBA PMST	CR	en	1	23/10/1941	Known from a few grassy woodland sites between Charlton and Bendigo, on shallow soil among emergent granite or sedimentary rocks.	Low - lack of abundant and recent records in the area.
Pultenaea platyphylla	Flat-leaf Bush-pea	VBA		en	9	24/09/2015	Confined to dry forest on granite hills, particularly in the Warby Range and near Beechworth, with disjunct occurrence near Maldon.	Low - despite species being known to occur in the local area it was not recorded during any of the assessments or targeted surveys that have been undertaken (Eco Logical Australia, 2023c).
Rutidosis leptorhynchoides	Button Wrinklewort	PMST	EN	en			In Victoria confined to basaltic grasslands between Rokewood and Melbourne where endangered due to loss of habitat (formerly occurring as far west as Casterton, and on the Gippsland Plain near Newry).	Low - no previous records in 10km radius
Rytidosperma monticola	Small-flower Wallaby-grass	VBA		en	3	15/12/2003	Mostly in dryish grassy woodland, chiefly through central and north-eastern Victoria (e.g. Ararat, Warby Range), but with isolated occurrences in the far east (e.g. Mt Delegate, upper Genoa), but rather rare in Victoria.	Recorded - High number of individuals previously recorded during previous assessments at the proposed quarry site (Eco Logical Australia, 2023a)

SCIENTIFIC NAME	SCIENTIFIC ON NAME	COMMON NAME S	SOURCE	CONSERVATION STATUS		COUNT OF	LAST	HABITAT DESCRIPTIONS	PTIONSLIKELIHOOD OF OCCURRENCEew populations in remnant n soils in north-central Victoria in urea, and between Donald andLow - no previous records
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE	
Sclerolaena napiformis	Turnip Copperburr	PMST	EN	cr			Known only from a few populations in remnant grassland on clay-loam soils in north-central Victoria in the Echuca-Nathalia area, and between Donald and Stawell in the west.	Low - no previous records in 10km radius	
Senecio behrianus	Stiff Groundsel, Behr's Groundsel	PMST	EN	cr			Apparently confined to heavy, winter-wet, clayey soils. Formerly known from Casterton, Swan Hill, Barham areas, with specimens from the 'Wimmera', and You Yangs near Lara of uncertain affinity.	Low - no previous records in 10km radius	
Senecio macrocarpus	Large-fruit Fireweed, Large- fruit Groundsel	PMST	VU	cr			In Victoria largely confined to remnant <i>Themeda</i> grasslands on loamy clay soils derived from basalt from near Melbourne west to Skipton area. Also known from auriferous ground near Stawell.	Low - no previous records in 10km radius	
Senecio psilocarpus	Swamp Fireweed, Smooth-fruited Groundsel	PMST	VU				In Victoria, the species is restricted to the south of the state. It grows in high quality herb rich wetlands where tree canopy is mostly absent on volcanic clays and peaty soils.	Low - no previous records in 10km radius	
Swainsona behriana	Southern Swainson- pea	VBA		en	1	5/01/2013	Species has a widespread but sporadic distribution in Victoria, occurring mostly in lowland areas west of Melbourne, but extending to montane areas in the east (e.g. Omeo, Cobungra, Gelantipy). Usually found in grassland and grassy woodland environments on relatively fertile soils.	Moderate - parts of the project area could provide suitable habitat for this species.	
Swainsona murrayana	Slender Darling-pea, Slender Swainson, Murray Swainson- pea	PMST	VU	en			Often grows in depressions on heavy soils in Bladder Saltbush herbland, Black Box woodland and grassland communities. Species is frequently associated with Maireana species.	Low - no suitable habitat to support this species.	

SCIENTIFIC	COMMON NAME	SOURCE	CONSERVATION STATUS				HABITAT DESCRIPTIONS	
NAME			EPBC ACT	FFG ACT	310111103	RECORD		OCCORRENCE
Tripogonella loliiformis	Rye Beetle-grass	VBA		en	1	12/04/2011	Species occurs across all mainland states. In Victoria, it is an uncommon grass of scattered distribution where it grows through drier areas on shallow soil that overly rock. Areas of occurrence include the basalt plains west of Melbourne, the Strathbogie Ranges, Killawarra Forest near Wangaratta, Beechworth, Suggan Buggan and Mt Arapiles.	Low - lack of abundant and recent records in the area.

Table legend

<u>EPBC Act:</u> CR= Critically Endangered, EN = Endangered, VU = Vulnerable

FFG Act: cr = *critically endangered, en* = *endangered, vu* = *vulnerable*

B2 Likelihood of Occurrence Assessment - Fauna

Table B.2 Likelihood of occurrence table – fauna

	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCE Is Low - no suitable habitat to support this species. s or Low - site is on the edge of the species range and is unlikely to frequently inhabit the site. red High - recorded by WSP within the broader property, but outside of the proposed quarry footprint. at Moderate - the project area has suitable foraging habitat to support this
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
BIRDS								
Actitis hypoleucos	Common Sandpiper	PMST	M, Mr	vu			The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats.	Low - no suitable habitat to support this species.
Anthochaera phrygia	Regent Honeyeater	VBA PMST	CR	cr	4	1/01/1929	Occurs mostly in box-ironbark forests and woodland and prefers wet, fertile sites such as along creek flats, broad river valleys and foothills. Riparian forests with <i>Casuarina cunninghamiana</i> and <i>Amyema cambagei</i> are important for feeding and breeding.	Low - site is on the edge of the species range and is unlikely to frequently inhabit the site.
Aphelocephala leucopsis	Southern Whiteface	VBA PMST	VU		35	15/08/2021	Dry open forests and acacia woodland and inland scrubs of mallee, mulga and saltbush are the preferred habitat of Southern Whiteface, especially areas with fallen timber or dead trees and stumps.	High - recorded by WSP within the broader property, but outside of the proposed quarry footprint.
Apus pacificus	Fork-tailed Swift	PMST	M, Mr				It is almost exclusively aerial, flying from < 1m to at least 300m above ground. It mostly occurs over inland plains but sometimes above foothills or in coastal areas over cliffs, beaches, islands and well out to sea. It also occurs over towns and cities. It mostly occurs over dry and/or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh, grassland, spinifex sandplains, farmland and sand-dunes. It sometimes occurs above forests.	Moderate - the project area has suitable foraging habitat to support this species.

	COMMON NAME	SOURCE	CONSERVATION STATUS		COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF OCCURRENCEing, but lampLow - no suitable habitat to support this species.reshwater islands only bitats.Low - no suitable habitat to support this species.tered aquatic, lant , lakes,Low - no suitable habitat to support this species.s of abitatsLow - no suitable habitat to support this species.s of aduatic; aquatic; amps, indLow - no suitable habitat to support this species.rackish call dense ushes. areas, the reed andLow - no suitable habitat to support this species.
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Ardea alba modesta	Eastern Great Egret	VBA		vu	3	24/03/2017	Prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands.	Low - no suitable habitat to support this species.
Ardea intermedia plumifera	Plumed Egret	VBA		cr	4	2/01/2001	Habitat preferences for this species include freshwater swamps, billabongs, floodplains and wet grasslands with dense aquatic vegetation. The species is only occasionally seen in estuarine or intertidal habitats.	Low - no suitable habitat to support this species.
Aythya australis	Hardhead	VBA		vu	13	11/01/2017	On terrestrial wetlands and occasionally sheltered estuarine and inshore waters. Almost entirely aquatic, preferring large deep fresh waters with abundant aquatic vegetation; particularly deep swamps, lakes, creeks, billabongs and alluvial plains.	Low - no suitable habitat to support this species.
Biziura lobata	Musk Duck	VBA		vu	11	16/02/2020	Widespread in Southeast and Southwest parts of continent, on terrestrial wetlands, estuarine habitats and sheltered inshore waters. Almost entirely aquatic; preferring deep water of large permanent swamps, lakes and estuaries, where conditions stable and aquatic flora abundant.	Low - no suitable habitat to support this species.
Botaurus poiciloptilus	Australasian Bittern	VBA PMST	EN	cr	1	1/01/1929	Occurs in shallow, vegetated freshwater or brackish swamps. Requires permanent wetlands with tall dense vegetation, particularly bulrushes and spike rushes. Whilst it can be found feeding in more open areas, the species relies on dense vegetation cover to breed and roost.	Low - no suitable habitat to support this species.
Bubulcus ibis	Cattle Egret	PMST	Mr (as Ardea ibis)				Occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. It is commonly associated with the habitats of farm animals, particularly cattle. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora.	Moderate - There is some suitable habitat within the haul road area.

	COMMON NAME S	SOURCE	CONSERVATION STATUS		S COUNT OF	LAST	HABITAT DESCRIPTIONS	LikeLihood of occurrence1Low - lack of abundant and recent records in the area.2Low - no suitable habitat to support this species.25Low - no suitable habitat to support this species.26Low - no suitable habitat to support this species.27Low - no suitable habitat to support this species.28Low - no suitable habitat to support this species.
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Burhinus grallarius	Bush Stone-curlew	VBA		cr	1	1/01/1929	Confined to grassy woodlands and farmlands, nests in Buloke, gum or box with a low, sparse grassy or herb understorey.	Low - lack of abundant and recent records in the area.
Calidris acuminata	Sharp-tailed Sandpiper	PMST	VU, M, Mr				Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland.	Low - no suitable habitat to support this species.
Calidris ferruginea	Curlew Sandpiper	PMST	CR, M, Mr	cr			Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes.	Low - no suitable habitat to support this species.
Calidris melanotos	Pectoral Sandpiper	PMST	M, Mr				Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands.	Low - no suitable habitat to support this species.

SCIENTIFIC	COMMON NAME	SOURCE	CONSERVAT	ION STATUS	COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Callocephalon fimbriatum	Gang-gang Cockatoo	PMST	EN	en			The Gang-gang Cockatoo can be seen throughout many parts of south-eastern Australia. In the summer months, they are mostly found at higher elevations, where they breed in tree-hollows in the moist eucalyptus forests of the mountainous Great Divide. After breeding has finished, and the days grow cooler and shorter, they undertake altitudinal movements, leaving the mountains and flying to lower elevations to spend the autumn and winter, when they are especially common in suburban gardens of lowland towns and cities.	Low - no previous records within a 10km radius.
Chalcites osculans	Black-eared Cuckoo	PMST	Mr (as Chrysococcyx osculans)				Mainly open vegetation associations, especially open woodlands and open shrublands. Often in open woodlands dominated by Eucalyptus, particularly stunted Mallee communities; Open woodlands of River Red Gum or Coolabah along rivers or round other wetlands in otherwise open grasslands.	Recorded - species previously recorded during assessments (Eco Logical Australia, 2023a).
Climacteris picumnus (victoriae)	Brown Treecreeper (south-eastern)	VBA PMST	VU		128	14/08/2021	Found in eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range. Mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts.	Recorded - species previously recorded during assessments (Habitat Management Services, 2021, Eco Logical Australia, 2023a).
Coracina maxima	Ground Cuckoo- shrike	VBA		en	1	1/01/1929	Inhabits open, usually rather dry, lightly timbered or sparsely vegetated country, including low eucalypt woodland and acacia scrub where they hunt out in the open on the ground.	Low - lack of abundant and recent records in the area.
Egretta garzetta	Little Egret	VBA		en	5	1/03/2001	Little Egrets inhabit mudflats, saltworks and shallow margins of tidal estuaries and inland rivers and lakes.	Low - no suitable habitat to support this species.

SCIENTIFIC	COMMON NAME	SOURCE	CONSERVAT	TION STATUS	COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		LIKELIHOOD OF OCCURRENCE Low - lack of abundant and recent records in the area. Moderate - the project area has suitable foraging habitat to support this species. Low - no suitable habitat to support this species. Low - no suitable habitat to support this species. Low - no suitable habitat to support this species. Moderate - despite no mistletoe being recorded, the species can feed on insects and nectar of eucalypts and therefore may utilise the project area for foraging. Low - no suitable habitat to support this species.
Falco hypoleucos	Grey Falcon	VBA PMST	VU	vu	2	28/12/1997	Victoria is on the periphery of the species arid-zone range, with most sightings from north-west Victoria, but the species is generally uncommon in the state, except during or following droughts. Species is usually restricted to arid and semi-arid regions, particularly along grassland, shrubland and woodland watercourses. Can occur near wetlands and in open woodlands near the coast.	Low - lack of abundant and recent records in the area.
Falco subniger	Black Falcon	VBA		cr	5	24/07/2011	Found in the arid and semi-arid zones. It is usually found near watercourses or utilizing patches of isolated trees. It hunts over open wooded grasslands, saltbush plains, bluebush plains and other low vegetation.	Moderate - the project area has suitable foraging habitat to support this species.
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	PMST	VU, M, Mr				Occurs in freshwater or brackish wetlands generally near protective vegetation cover.	Low - no suitable habitat to support this species.
Geopelia cuneata	Diamond Dove	VBA		vu	1	1/01/1929	The species is widely distributed in arid and semi-arid grassland savannah. They gather in small parties or flocks in dry open savanna in mulga areas often among spinifex or grasses. They are also often in open riparian woodland (beside waterways). They breed throughout their range, at any time after heavy rainfall.	Low - no suitable habitat to support this species.
Grantiella picta	Painted Honeyeater	VBA PMST	VU	vu	1	15/12/2017	Lives in dry forests and woodlands. Primary food is the mistletoes in the genus <i>Amyema</i> , though it will take some nectar and insects. Its breeding distribution is dictated by presence of mistletoes which are largely restricted to older trees.	Moderate - despite no mistletoe being recorded, the species can feed on insects and nectar of eucalypts and therefore may utilise the project area for foraging.
Haliaeetus leucogaster	White-bellied Sea- Eagle	VBA PMST	Mr	en	3	14/01/2021	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs.	Low - no suitable habitat to support this species.

	COMMON NAME	SOURCE	CONSERVAT	ION STATUS	COUNT OF		HABITAT DESCRIPTIONS	
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Hieraaetus morphnoides	Little Eagle	VBA		vu	35	22/01/2021	The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest.	High - recorded within the broader property, but outside of the proposed quarry footprint (Habitat Management Services, 2021).
Hirundapus caudacutus	White-throated Needletail	VBA PMST	VU, M, Mr	vu	3	22/01/2017	Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns.	Moderate - the project area has suitable foraging habitat to support this species.
Ixobrychus dubius	Australian Little Bittern	VBA		en	1	1/10/1978	Species is found in a range of freshwater swamp habitats that are inundated by at least 30cm of water and support tall rushes, reeds, Typha, shrub thickets or other dense cover. Being cryptic in nature, the species prefers smaller patches of dense vegetation along drains or small urban lakes where it remains within or on the edge of wetland vegetation.	Low - no suitable habitat to support this species.
Lathamus discolor	Swift Parrot	VBA PMST	CR, Mr	сг	9	21/06/2021	In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering <i>Acacia</i> <i>pycnantha</i> .	Recorded - species previously recorded during assessments (Habitat Management Services, 2021, Eco Logical Australia, 2023c).
Lophochroa leadbeateri	Pink Cockatoo (formally Major Mitchell's Cockatoo)	VBA	EN	cr	1	1/09/1977	Favours <i>callitris, allocasuarina</i> and eucalyptus woodlands in arid or semi-arid regions.	Low - lack of abundant and recent records in the area.

SCIENTIFIC	COMMON NAME	SOURCE	CONSERVA	TION STATUS	COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Lophoictinia isura	Square-tailed Kite	VBA		vu	1	6/01/2019	This species hunts primarily over open forest, woodland and Mallee communities as well as over adjacent heaths and other low scrubby habitats in wooded towns.	Recorded - species previously recorded during assessments (Eco Logical Australia, 2023a).
Melanodryas cucullata	Hooded Robin	VBA	EN	vu	20	28/06/2020	Found in south-eastern Australia, generally east of the Great Dividing Range. Found in eucalypt woodland and Mallee and acacia shrubland.	Recorded - species previously recorded during assessments (Habitat Management Services, 2021, Eco Logical Australia, 2023a).
Melanodryas cucullata cucullata	South-eastern Hooded Robin	PMST	EN	vu (as Melanodryas cucullata)			Found in south-eastern Australia, generally east of the Great Dividing Range. Found in eucalypt woodland and Mallee and acacia shrubland.	Low - project area is outside of the species usual range and there have been no previous records within a 10km radius.
Merops ornatus	Rainbow Bee-eater	PMST	Mr				Usually occur in open or lightly timbered areas, often near water. Breed in open areas with friable, often sandy soil, good visibility, convenient perches and often near wetlands. Nests in embankments including creeks, rivers and sand dunes.	Recorded - species recorded by WSP and during previous assessments (Eco Logical Australia, 2023a).
Motacilla flava	Yellow Wagtail	PMST	M, Mr				This species occurs in a range of habitats including estuarine habitats such as sand dunes, mangrove forests and coastal saltmarshes. This species also occurs in open grassy areas including disturbed sites such as sports grounds and has been recorded on the edges of wetlands, swamps, lakes and farm dams.	Low - no suitable habitat to support this species.
Myiagra cyanoleuca	Satin Flycatcher	PMST	M, Mr				Occurs in heavily vegetated gullies, in forests and taller woodlands. During migration it is found in coastal forests, woodlands, mangroves, trees in open country and gardens.	Low - no suitable habitat to support this species.

	COMMON NAME	SOURCE	CONSERVAT	CONSERVATION STATUS			HABITAT DESCRIPTIONS	LIKELIHOOD OF
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		LIKELIHOOD OF DCCURRENCE Low – Species has not been recorded in the project area, and no important populations are known to occur within the broader woodland patch. High – Four individuals were recorded outside of the quarry area but within the broader property (Habitat Management Services, 2021). The species was not recorded during subsequent targeted surveys (Eco Logical Australia, 2023a). High - precautionary principle applied and species considered present by (Habitat Management Services, 2021).
Neophema chrysostoma	Blue-winged Parrot	VBA PMST	VU, Mr		1	11/11/1998	The main populations of Blue-winged Parrots are in Tasmania and Victoria, particularly in southern Victoria and the midlands and eastern areas of Tasmania. The Blue-winged Parrot inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range they favour grasslands and grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones. Blue-winged Parrots can also be seen in altered environments such as airfields, golf- courses and paddocks.	Low – Species has not been recorded in the project area, and no important populations are known to occur within the broader woodland patch.
Neophema pulchella	Turquoise Parrot	(Habitat Management Services, 2021)		vu	4	2021	This species favours open, grassy woodland with dead trees near permanent water. It also inhabits coastal heaths and pastures with exotic grasses and weeds, along roadsides and in orchards.	High – Four individuals were recorded outside of the quarry area but within the broader property (Habitat Management Services, 2021). The species was not recorded during subsequent targeted surveys (Eco Logical Australia, 2023a).
Ninox connivens	Barking Owl	VBA		cr	2	29/10/2020	Found in open woodlands and the edges of forests, often adjacent to farmland. They are less likely to use the interior of forested habitat. They are usually found in habitats that are dominated by Eucalyptus species, particularly red gum, and, in the tropics, paperbark species. They prefer woodlands and forests with a high density of large trees and particularly sites with hollows that are used by the owls as well as their prey.	High - precautionary principle applied and species considered present by (Habitat Management Services, 2021).

	COMMON NAME	SOURCE	CONSERVAT	ION STATUS	COUNT OF		LAST HABITAT DESCRIPTIONS	
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Ninox strenua	Powerful Owl	VBA		vu	1	1/01/1929	Typically found in open forests and woodlands, sheltered gullies in wet forests with dense understoreys along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches.	Low - no suitable habitat to support this species.
Oreoica gutturalis	Crested Bellbird	VBA		en	4	7/10/1999	Occurs west of the Great Dividing Range from semi- arid to arid shrublands, woodlands, spinifex and chenopod plains.	Moderate - the project area has suitable foraging and breeding habitat to support this species.
Pedionomus torquatus	Plains-wanderer	PMST	CR	cr			Sparse grasslands that have 50% bare ground, widely spaced plants up to 10 cm high and remaining standing vegetation less than 5 centimetres in height. Occasionally uses cereal stubble but cannot persist in agricultural landscape. Suitable habitat tends to be restricted to small (50-300 ha) patches that do not support dense pasture growth under any seasonal conditions.	Low - no suitable habitat to support this species.
Polytelis swainsonii	Superb Parrot	PMST	VU	en			The Superb Parrot occurs along timbered waterways and well-water forests and woodlands dominated by eucalypts, especially River Red Gums, Yellow Box or Grey Box.	Low - no suitable habitat to support this species.
Pomatostomus temporalis	Grey-crowned Babbler	VBA		vu	2	12/09/2019	Occupy open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs.	High - recorded within the broader property, but outside of the proposed quarry footprint by WSP and previous assessors (Habitat Management Services, 2021)

SCIENTIFIC	COMMON NAME	SOURCE	CONSERVAT	ION STATUS	COUNT OF		HABITAT DESCRIPTIONS	LIKELIHOOD OF
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Pyrrholaemus sagittatus	Speckled Warbler	VBA		en	11	11/11/2016	In Victoria, the speckled warbler is found within a broad strip, including the Chiltern Box- Ironbark and Warby-Ovens National Parks, the Bendigo region, the Brisbane Ranges and You Yangs, across to Balmoral on the western side of the Grampians. Its preferred habitat is open eucalypt woodland with rocky gullies, tussocky grass, scattered logs, and sparse shrubbery.	Recorded - species previously recorded during assessments (Habitat Management Services, 2021, Eco Logical Australia, 2023a).
Rhipidura rufifrons	Rufous Fantail	PMST	M, Mr				Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens.	Low - no suitable habitat to support this species.
Rostratula australis	Australian Painted Snipe	PMST	EN, Mr (as <i>Rostratula</i> <i>benghalensis</i> (sensu lato))	cr			Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as River Red Gum and Poplar Box or shrubs such as Lignum or Samphire.	Low - no suitable habitat to support this species.
Spatula rhynchotis	Australasian Shoveler	VBA		vu	3	2/12/2000	Uses a wide variety of wetlands but prefers large permanent lakes or swamps that have abundant cover.	Low - no suitable habitat to support this species.
Stagonopleura guttata	Diamond Firetail	VBA PMST	VU	vu	12	10/05/2021	Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and Mallee.	Recorded - species previously recorded during assessments (Habitat Management Services, 2021, Eco Logical Australia, 2023a).
Stictonetta naevosa	Freckled Duck	VBA		en	1	24/10/1958	In most years this species appear to be nomadic between ephemeral inland wetlands. In dry years they congregate on permanent wetlands while in wet years they breed prolifically and disperse widely, generally towards the coast.	Low - no suitable habitat to support this species.

SCIENTIFIC	COMMON NAME	SOURCE	CONSERVAT	TION STATUS	COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		LIKELIHOOD OF OCCURRENCEide variety of tats of stal habitats, h,Low - no suitable habitat to support this species.ough appears forest types, ge > been n woodland urrence in es.Low - the project area does not support the specie preferred habitat features and there have been no previous records within a 10km radiusLow - no suitable habitat to support this speciesLow - no suitable habitat to support this speciesLow - no suitable habitat to support this speciesLow - no suitable habitat to support this speciesKecorded - species previously recorded during assessments (Habitat Management Services, 2021)Low - no suitable habitat to support this species.
Tringa nebularia	Common Greenshank, Greenshank	PMST	EN, M, Mr	en			The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	Low - no suitable habitat to support this species.
MAMMALS								
<i>Dasyurus</i> maculatus maculatus (SE mainland population)	Spot-tailed Quoll	PMST	EN	en			Occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large unfragmented patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges.	Low – the project area does not support the specie preferred habitat features and there have been no previous records within a 10km radius.
Ornithorhynchus anatinus	Platypus	VBA		vu	1	3/08/2022	Occurs along the east coast of Australia where it inhabits freshwater aquatic ecosystems in tropical rainforest lowlands and plateaus in far northern Queensland to colder environments at higher altitudes in Tasmania and the Australian Alps. The platypus prefers rivers and streams with a coarse bottom substrate for increased invertebrate fauna for food as well as earth banks for burrows and native vegetation for shade.	Low - no suitable habitat to support this species.
Phascogale tapoatafa	Brush-tailed Phascogale	VBA		vu	5	18/02/2022	Largely arboreal it occurs in a range of habitats which have reliable rainfall (500-2000mm), but has preference for open dry sclerophyll forest on ridges (up to 600 m altitude) with little/sparse ground cover.	Recorded - species previously recorded during assessments (Habitat Management Services, 2021).
Pteropus poliocephalus	Grey-headed Flying- fox	PMST	VU	vu			Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species.	Low - no suitable habitat to support this species.

SCIENTIFIC	COMMON NAME	SOURCE	CONSERVAT	ION STATUS	COUNT OF	LAST	HABITAT DESCRIPTIONS	LIKELIHOOD OF
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCURRENCE
Sminthopsis crassicaudata	Fat-tailed Dunnart	VBA		vu	1	5/01/2013	In a variety of open vegetation habitats including open woodland, low shrublands of saltbush and bluebush, tussock grasslands on clay or sandy soils, glibber plain and, in southern parts of its range, farmlands.	Low - lack of abundant and recent records in the area.
REPTILES								
Aprasia parapulchella	Pink-tailed Worm- lizard	PMST	VU	en			In general, lizards occur in open grassland habitats that have a substantial cover of small rocks. Lizards also show a preference for sunny aspects, avoiding south facing slopes. A burrowing species, it is usually found under rocks on well-drained soil and in ant nests, occasionally with several individuals found under the same rock.	Low - Previous targeted surveys did not detect the species and there are no previous records within a 10km radius.
Delma impar	Striped Legless Lizard	PMST	VU	en			Within their historical range across south-eastern Australia, potential habitat for the Striped Legless Lizard includes all areas which have, or once had, native grasslands or grassy woodlands (including derived grasslands), provided that area retains suitable tussock structure, the soil is of appropriate type and structure, and the site has not had major disturbance such as ploughing.	Low - Previous targeted surveys did not detect the species and there are no previous records within a 10km radius.
Pogona barbata	Bearded Dragon	VBA		vu	2	15/01/1997	Inhabits woodlands and dry sclerophyll forest from Cairns, Queensland, to southern Eyre Peninsula, South Australia.	Moderate - the project area has potential suitable habitat to support this species.
Varanus varius	Lace Monitor	VBA		en	1	15/01/1997	Occurs in well-timbered areas, from dry woodlands to cool temperate southern forests. Arboreal, ascending large trees when disturbed. Will shelter in tree hollows, hollow logs and burrows dug by other animals. Active termite mounds are required for nesting.	Recorded - species previously recorded during assessments (Eco Logical Australia, 2023a).

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVAT	ION STATUS	COUNT OF		HABITAT DESCRIPTIONS	
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCORRENCE
AMPHIBIANS								
Crinia sloanei	Sloane's Froglet	PMST	EN	en			Adults are most common in woodlands, floodplains, grasslands, and open and disturbed areas. Within these habitats they shelter under logs and other debris, usually in moist depressions or near water. Eggs and tadpoles are aquatic and can be found in ponds, dams, swamps, flooded grassland, ditches and hollows.	Low - Drainage lines and watercourses within the project area do not provide suitable habitat to support this species.
Litoria raniformis	Growling Grass Frog, Southern Bell Frog	VBA PMST	VU	vu	1	01/01/1788	Usually found amongst emergent vegetation such as Typha, Phragmites and Eleocharis within or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds, and farm dams. It also in occurs in irrigation channels and crops, lignum shrublands, black box and river red gum woodlands and at the periphery of rivers.	Low - Drainage lines and watercourses within the project area do not provide suitable habitat to support this species.
FISH			1	1				
Bidyanus bidyanus	Silver Perch	PMST	CR	en			Habitat includes rivers and large streams although preferred conditions are not definitive. Silver Perch has been recorded from 12 river basins in Victoria, with the majority of records from the Goulburn River, Loddon River, Murray Riverina, and the Mallee.	Low - Drainage lines and watercourses within the project area do not provide suitable habitat to support this species.
Galaxias rostratus	Flathead Galaxias	PMST	CR	vu			Only known in the Southern half of the Murray- Darling Basin system. Inhabits a variety of habitats including billabongs, lakes, swamps, and rivers with a preference for still or slow flowing waters.	Low - Drainage lines and watercourses within the project area do not provide suitable habitat to support this species.

SCIENTIFIC NAME	COMMON NAME	SOURCE	CONSERVAT	ION STATUS	COUNT OF SIGHTINGS	LAST RECORD	HABITAT DESCRIPTIONS	
NAWE			EPBC ACT	FFG ACT				OCCURRENCE
Maccullochella macquariensis	Trout Cod	PMST	EN	en			The species distribution has declined since European settlement, with a naturally occurring population now restricted to a small stretch of the Murray River from Yarrawonga Weir to Strathmerton. There are translocated and stocked population throughout the Goulburn, Ovens, Broken, Coliban and Mitta Mitta River catchments in Victoria. Trout Cod occupy stream positions with an abundance of large woody debris in deep water close to riverbanks.	Low - Drainage lines and watercourses within the project area do not provide suitable habitat to support this species.
Maccullochella peelii	Murray Cod	VBA PMST	VU	en	4	1/03/1994	Occurs in lower reaches of the Murray-Darling Basin, where the water temperature is warm. The diverse range of habitats frequented by the Murray Cod includes slow moving rivers, murky billabongs and clear, rocky rivers.	Low - Drainage lines and watercourses within the project area do not provide suitable habitat to support this species.
<i>Nannoperca australis</i> (Murray- Darling Basin lineage)	Southern Pygmy Perch (Murray- Darling Basin lineage)	PMST	VU	vu			The Southern pygmy perch prefers slow flowing or still waters, usually with dense aquatic vegetation and plenty of cover. It has been recorded from small streams, well-vegetated lakes (or wetlands within), billabongs and irrigation channels. It is still common in southern (coastal) Vic, but is patchily distributed along Vic tributaries of the Murray, where it is still known from the Broken, Ovens, Campaspe, Goulburn, Kiewa, Mitta Mitta, Loddon and Wimmera basins.	Low - Drainage lines and watercourses within the project area do not provide suitable habitat to support this species.

	COMMON NAME	SOURCE	CONSERVAT	ION STATUS		LAST	HABITAT DESCRIPTIONS	LikeLihood of occurrence Low - no suitable habitat to support this species. Low - no suitable habitat to support this species and no previous records within		
NAME			EPBC ACT	FFG ACT	SIGHTINGS	RECORD		OCCORRENCE		
INVERTEBRATES										
Paralucia pyrodiscus lucida	Eltham Copper Butterfly	PMST	EN	en			Known from several discreet population, including Castlemaine in Central Victoria. Found in sparse dry woodland consisting mainly of Red Stringybark, Red Box, Long-leaved Box. Lays its eggs on Sweet Bursaria.	Low - no suitable habitat to support this species.		
Synemon plana	Golden Sun Moth	PMST	VU	vu			This species occurs Natural Temperate Grasslands, exotic grassland and some secondary grassland. Larvae feed on the roots of native grasses, particularly wallaby grasses Rytidosperma spp. They also feed on the introduced noxious weed Chilean Needlegrass.	Low - no suitable habitat to support this species and no previous records within a 10km radius.		

Table legend

<u>EPBC Act</u>: CR = Critically Endangered, EN = Endangered, VU = Vulnerable, M = Migratory, Mr = Marine <u>FFG Act</u>: cr = critically endangered, en = endangered, vu = vulnerable
Appendix C Species list



C1 Flora species list

Table C.1

Flora species recorded during WSP site assessments and targeted surveys

Exotic	Scientific Name	Common Name	FFG Act Listed	FFG Act Protected	CaLP Act
	Acacia pycnantha	Golden Wattle		Yes - Restricted use	-
*	Aira elegantissima	Delicate Hair-grass			-
	Ajuga australis	Austral Bugle			-
	Allocasuarina luehmannii	Buloke	cr		-
	Anthosachne scabra s.l.	Common Wheat-grass			-
	Aristida behriana	Brush Wire-grass			-
	Arthropodium fimbriatum	Nodding Chocolate-lily			-
	Arthropodium strictum s.s.	Chocolate Lily			-
	Astroloma humifusum	Cranberry Heath		Yes - Restricted use	-
	Austrostipa densiflora	Dense Spear-grass			-
	Austrostipa mollis	Supple Spear-grass			-
	Austrostipa scabra subsp. falcata	Rough Spear-grass			-
	Austrostipa scabra subsp. scabra	Rough Spear-grass			-
*	Avena fatua	Wild Oat			-
	Brachyscome perpusilla	Tiny Daisy		Yes - Restricted use	-
*	Briza maxima	Large Quaking-grass			-
	Bulbine bulbosa	Bulbine Lily			-
	Caladenia carnea	Pink Fingers		Yes - General use	-
	Carex breviculmis	Common Grass-sedge			-
	Carex inversa	Knob Sedge			-
	Cassinia arcuata	Drooping Cassinia			-
#	Cassinia sifton	Drooping Cassinia			-
	Cheilanthes austrotenuifolia	Green Rock-fern			-
	Cheilanthes sieberi subsp. sieberi	Narrow Rock-fern			-
	Chrysocephalum vitellinum	Annual Everlasting		Yes - Restricted use	-
	Convolvulus angustissimus	Blushing Bindweed			-
	Dianella longifolia var. grandis	Glaucous Flax-lily	cr		-
	Dillwynia cinerascens s.l.	Grey Parrot-pea			-
	Diuris pardina	Leopard Orchid		Yes - General use	-
	Einadia hastata	Saloop			-
	Einadia nutans	Nodding Saltbush			-
*	Erodium botrys	Large Herron's-bill			-

Exotic	Scientific Name	Common Name	FFG Act Listed	FFG Act Protected	CaLP Act
	Eucalyptus microcarpa	Grey Box			-
	Eutaxia microphylla var. microphylla	Common Eutaxia			-
*	Fumaria bastardii	Bastards Fumitory			
*	Gazania linearis	Gazania			
	Glycine clandestina	Twining Glycine			
	Gonocarpus elatus	Tall Raspwort			-
	Gonocarpus tetragynus	Common Raspwort			-
	Hypericum gramineum	Small St John's Wort			-
*	Hypochoeris glabra	Smooth Cat's-ear			-
*	Hypochoeris radicata	Flatweed			-
*	Juncus capitatus	Capitate Rush			-
	Juncus subsecundus	Finger Rush			-
	Lagenophora gunniana	Coarse Bottle-daisy		Yes - Restricted use	-
	Leptorhynchos tetrachaetus	Beauty Buttons		Yes - Restricted use	-
	Lomandra filiformis subsp. filiformis	Wattle Mat-rush			-
	Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush			-
	Lomandra nana	Dwarf Mat-rush			-
	Microseris walteri	Yam Daisy		Yes - Restricted use	-
*	Opuntia stricta	Common Prickly-pear			С
	Ozothamnus obcordatus	Grey everlasting		Yes - Restricted use	-
	Pelargonium rodneyanum	Magenta Stork's-bill			-
	Pimelea curviflora var. sericea	Curved Rice-flower			-
	Pimelea humilis	Common Rice-flower			-
	Ranunculus lappaceus	Australian Buttercup			-
	Rhagodia spinescens	Hedge Saltbush			-
	Rumex brownii	Slender Dock			-
	Rytidosperma erianthum	Hill Wallaby-grass			-
	Rytidosperma fulvum	Copper-awned Wallaby- grass			-
	Rytidosperma monticola	Small-flower Wallaby-grass	en		-
	Rytidosperma racemosum var. racemosum	Slender Wallaby-grass			-
	Rytidosperma setaceum	Bristly Wallaby-grass			-
	Schoenus apogon	Common Bog-sedge			-
*	Scolymus hispanicus	Golden Thistle			С
	Senecio quadridentatus	Cotton Fireweed			-

Exotic	Scientific Name	Common Name	FFG Act Listed	FFG Act Protected	CaLP Act
*	Sonchus oleraceus	Common Sow-thistle			-
	Stackhousia monogyna s.l.	Creamy Stackhousia			-
	Thelymitra pauciflora	Slender Sun Orchid		Yes - General use	-
	Themeda triandra	Kangaroo Grass			-
	Trifolium glomeratum	Cluster Clover			-
	Triptilodiscus pygmaeus	Common Sunray			-
	Veronica plebeia	Trailing Speedwell			-
	Vittadinia cuneata	Fuzzy New Holland Daisy		Yes - Restricted use	-
*	Vulpia myuros	Rat's-tail Fescue			-
	Wahlenbergia capillaris	Tufted Bluebell			-
	Wahlenbergia luteola	Bronze Bluebell			
	Wurmbea dioica	Common Early Nancy			-
	Xerochrysum viscosum	Shiny Everlasting		Yes - Restricted use	-

Legend

- Conservation Status in Victoria (Flora and Fauna Guarantee Act 1988) cr = critically endangered, en = endangered

- CaLP Act: C = Regionally Controlled weeds
- Exotic: *introduced, # native but some stands may be alien

C2 Fauna species list

Table C.2

Fauna species recorded during site assessments

Common Name	Scientific Name	Conservation Status			
		EPBC Act	FFG Act		
Birds	-		1		
Australian Raven	Corvus coronoides				
Black-faced Cuckoo-shrike	Coracina novaehollandiae				
Grey Currawong	Strepera versicolor				
Grey Fantail	Rhipidura albiscapa				
Jacky Winter	Microeca fascinans		VTWBC species		
Olive-backed Oriole	Oriolus sagittatus				
Rainbow Bee-eater	Merops ornatus	Marine			
Rufous Whistler	Pachycephala rufiventris				
Satin Flycatcher	Myiagra cyanoleuca				
Spotted Pardalote	Pardalotus punctatus				
Weebill	Smicrornis brevirostris				
Whistling Kite	Haliastur sphenurus				
White-browed Woodswallow	Artamus superciliosus				
White-plumed Honeyeater	Ptilotula penicillata				
White-winged Chough	Corcorax melanorhamphos				
Willie Wagtail	Rhipidura leucophrys				
Yellow-rumped Thornbill	Acanthiza chrysorrhoa				
Mammals	·		·		
Black-tailed Wallaby	Wallabia bicolor				
Eastern Grey Kangaroo	Macropus giganteus				

Appendix D Tree Data



D1 Tree Data

Table D.1Tree data recorded within 20m of the project area

ID #	Scientific Name	Common Name	DBH (cm)	Size Class	Туре	TPZ (m)	Project Area	Impacted	Habitat	Notes	Source
1	Eucalyptus microcarpa	Grey Box	89	Large	СТ	10.68	Quarry	Yes			ELA
2	Eucalyptus microcarpa	Grey Box	125	Large	СТ	15	Quarry	Yes			ELA
3	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	No			ELA
4	Eucalyptus microcarpa	Grey Box	85	Large	СТ	10.2	Quarry	Yes		Dead/ Honey bee nesting in hollow	ELA
5	Eucalyptus microcarpa	Grey Box	91	Large	СТ	10.92	Quarry	Yes			ELA
6	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	Yes			ELA
7	Eucalyptus microcarpa	Grey Box	92	Large	СТ	11.04	Quarry	No	Refuge - Medium hollows (7-15cm)		ELA
8	Eucalyptus microcarpa	Grey Box	75	Large	СТ	9	Quarry	Yes			ELA
9	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
10	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
11	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
12	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
13	Eucalyptus microcarpa	Grey Box	96	Large	СТ	11.52	Quarry	Yes			ELA
14	Eucalyptus microcarpa	Grey Box	96	Large	СТ	11.52	Quarry	Yes			ELA
15	Eucalyptus microcarpa	Grey Box	106	Large	СТ	12.72	Quarry	Yes			ELA

ID #	Scientific Name	Common Name	DBH (cm)	Size Class	Туре	TPZ (m)	Project Area	Impacted	Habitat	Notes	Source
16	Eucalyptus microcarpa	Grey Box	87	Large	СТ	10.44	Quarry	No			ELA
17	Eucalyptus microcarpa	Grey Box	87	Large	СТ	10.44	Quarry	Yes	Refuge - Medium hollows (7-15cm)		ELA
18	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
19	Eucalyptus microcarpa	Grey Box	94	Large	СТ	11.28	Quarry	Yes			ELA
20	Eucalyptus microcarpa	Grey Box	83	Large	СТ	9.96	Quarry	Yes			ELA
21	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
22	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	Yes			ELA
23	Eucalyptus microcarpa	Grey Box	84	Large	СТ	10.08	Quarry	Yes			ELA
24	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	Yes	Refuge - Large hollows (>15cm)	Dead	ELA
25	Eucalyptus microcarpa	Grey Box	99	Large	СТ	11.88	Quarry	Yes			ELA
26	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	Yes	Refuge - Medium hollows (7-15cm)		ELA
27	Eucalyptus microcarpa	Grey Box	72	Large	СТ	8.64	Quarry	Yes			ELA
28	Eucalyptus microcarpa	Grey Box	94	Large	СТ	11.28	Quarry	Yes		Dead	ELA
29	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes		Dead	ELA
30	Eucalyptus microcarpa	Grey Box	98	Large	СТ	11.76	Quarry	Yes			ELA
31	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
32	Eucalyptus microcarpa	Grey Box	72	Large	СТ	8.64	Quarry	No		Dead	ELA
33	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	Yes			ELA

ID #	Scientific Name	Common Name	DBH (cm)	Size Class	Туре	TPZ (m)	Project Area	Impacted	Habitat	Notes	Source
34	Eucalyptus microcarpa	Grey Box	100	Large	СТ	12	Quarry	No			ELA
35	Eucalyptus microcarpa	Grey Box	73	Large	СТ	8.76	Quarry	Yes			ELA
36	Eucalyptus microcarpa	Grey Box	85	Large	СТ	10.2	Quarry	Yes		Dead	ELA
37	Eucalyptus microcarpa	Grey Box	73	Large	СТ	8.76	Quarry	Yes			ELA
38	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
39	Eucalyptus microcarpa	Grey Box	72	Large	СТ	8.64	Quarry	Yes			ELA
40	Eucalyptus microcarpa	Grey Box	72	Large	СТ	8.64	Quarry	Yes			ELA
41	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	Yes			ELA
42	Eucalyptus microcarpa	Grey Box	96	Large	СТ	11.52	Quarry	Yes			ELA
43	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	Yes			ELA
44	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
45	Eucalyptus microcarpa	Grey Box	79	Large	СТ	9.48	Quarry	Yes			ELA
46	Eucalyptus microcarpa	Grey Box	71	Large	СТ	8.52	Quarry	Yes			ELA
47	Eucalyptus microcarpa	Grey Box	82	Large	СТ	9.84	Quarry	Yes	Refuge - Medium hollows (7-15cm)		ELA
48	Eucalyptus microcarpa	Grey Box	112	Large	СТ	13.44	Quarry	Yes	Refuge - Large hollows (>15cm)		ELA
49	Eucalyptus microcarpa	Grey Box	91	Large	СТ	10.92	Quarry	Yes			ELA
50	Eucalyptus microcarpa	Grey Box	81	Large	СТ	9.72	Quarry	Yes			ELA
51	Eucalyptus microcarpa	Grey Box	85	Large	СТ	10.2	Quarry	Yes		Dead	ELA

ID #	Scientific Name	Common Name	DBH (cm)	Size Class	Туре	TPZ (m)	Project Area	Impacted	Habitat	Notes	Source
52	Eucalyptus microcarpa	Grey Box	79	Large	СТ	9.48	Quarry	Yes			ELA
53	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
54	Eucalyptus microcarpa	Grey Box	77	Large	СТ	9.24	Quarry	Yes	Refuge - Small hollows (<7cm)		ELA
55	Eucalyptus microcarpa	Grey Box	88	Large	СТ	10.56	Quarry	No	Refuge - Medium hollows (7-15cm)	Dead	ELA
56	Eucalyptus melliodora	Yellow Box	136	Large	СТ	15	Quarry	No			ELA
57	Eucalyptus microcarpa	Grey Box	72	Large	СТ	8.64	Quarry	Yes		Dead	ELA
58	Eucalyptus microcarpa	Grey Box	72	Large	СТ	8.64	Quarry	Yes	Refuge - Large hollows (>15cm)		ELA
59	Eucalyptus microcarpa	Grey Box	86	Large	СТ	10.32	Quarry	Yes			ELA
60	Eucalyptus microcarpa	Grey Box	90	Large	СТ	10.8	Quarry	Yes			ELA
61	Eucalyptus microcarpa	Grey Box	74	Large	СТ	8.88	Quarry	No			ELA
62	Eucalyptus microcarpa	Grey Box	73	Large	СТ	8.76	Quarry	Yes			ELA
63	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	No			ELA
64	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	No		Dead	ELA
65	Eucalyptus microcarpa	Grey Box	84	Large	СТ	10.08	Quarry	Yes			ELA
66	Eucalyptus microcarpa	Grey Box	71	Large	СТ	8.52	Quarry	Yes			ELA
67	Eucalyptus microcarpa	Grey Box	74	Large	СТ	8.88	Quarry	Yes			ELA
68	Eucalyptus microcarpa	Grey Box	115	Large	СТ	13.8	Quarry	Yes			ELA

ID #	Scientific Name	Common Name	DBH (cm)	Size Class	Туре	TPZ (m)	Project Area	Impacted	Habitat	Notes	Source
69	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes	Refuge - Medium hollows (7-15cm)		ELA
70	Eucalyptus microcarpa	Grey Box	73	Large	СТ	8.76	Quarry	Yes			ELA
71	Eucalyptus microcarpa	Grey Box	90	Large	СТ	10.8	Quarry	Yes			ELA
72	Eucalyptus microcarpa	Grey Box	71	Large	СТ	8.52	Quarry	Yes			ELA
73	Eucalyptus microcarpa	Grey Box	79	Large	СТ	9.48	Quarry	Yes	Refuge - Medium hollows (7-15cm)	Dead	ELA
74	Eucalyptus microcarpa	Grey Box	90	Large	СТ	10.8	Quarry	Yes		Dead	ELA
75	Eucalyptus microcarpa	Grey Box	90	Large	СТ	10.8	Quarry	Yes			ELA
76	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Quarry	Yes			ELA
77	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Quarry	Yes			ELA
78	Eucalyptus microcarpa	Grey Box	105	Large	СТ	12.6	Haul Road	Yes			ELA
79	Eucalyptus microcarpa	Grey Box	91	Large	СТ	10.92	Haul Road	Yes			ELA
80	Eucalyptus microcarpa	Grey Box	120	Large	СТ	14.4	Haul Road	Yes			ELA
81	Eucalyptus microcarpa	Grey Box	82	Large	СТ	9.84	Haul Road	No			ELA
82	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Haul Road	No			ELA
83	Eucalyptus microcarpa	Grey Box	90	Large	СТ	10.8	Haul Road	No			ELA
84	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Haul Road	No			ELA
85	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Haul Road	No	Refuge - Medium hollows (7-15cm)		ELA
86	Eucalyptus microcarpa	Grey Box	80	Large	СТ	9.6	Haul Road	No			ELA

ID #	Scientific Name	Common Name	DBH (cm)	Size Class	Туре	TPZ (m)	Project Area	Impacted	Habitat	Notes	Source
87	Eucalyptus microcarpa	Grey Box	100	Large	СТ	12	Haul Road	No			ELA
88	Eucalyptus microcarpa	Grey Box	62	Small	СТ	7.44	Haul Road	No			ELA
89	Eucalyptus microcarpa	Grey Box	62	Small	СТ	7.44	Haul Road	No		Dead	ELA
90	Eucalyptus microcarpa	Grey Box	120	Large	СТ	14.4	Haul Road	No			ELA
91	Eucalyptus microcarpa	Grey Box	100	Large	СТ	12	Haul Road	No			ELA
92	Eucalyptus microcarpa	Grey Box	120	Large	СТ	14.4	Haul Road	No			ELA
93	Eucalyptus microcarpa	Grey Box	95	Large	СТ	11.4	Haul Road	No			ELA
94	Eucalyptus microcarpa	Grey Box	70	Large	СТ	8.4	Haul Road	No			ELA
95	Eucalyptus melliodora	Yellow Box	100	Large	СТ	12	Haul Road	No			ELA
96	Eucalyptus microcarpa	Grey Box	75	Large	ST	9	Haul Road	Yes		Dead	ELA
97	Eucalyptus microcarpa	Grey Box	138	Large	СТ	15	Haul Road	No			ELA
98	Eucalyptus microcarpa	Grey Box	85	Large	СТ	10.2	Haul Road	Yes			ELA
99	Eucalyptus microcarpa	Grey Box	74	Large	СТ	8.88	Haul Road	Yes			ELA
100	Eucalyptus microcarpa	Grey Box	145	Large	СТ	15	Haul Road	No			ELA
101	Eucalyptus leucoxylon subsp. leucoxylon	Yellow Gum	88	Large	СТ	10.56	Haul Road	No			ELA
102	Eucalyptus leucoxylon subsp. leucoxylon	Yellow Gum	115	Large	СТ	13.8	Haul Road	No			ELA
103	Eucalyptus melliodora	Yellow Box	94	Large	СТ	11.28	Haul Road	No			ELA
104	Eucalyptus melliodora	Yellow Box	121	Large	СТ	14.52	Haul Road	No			ELA
105	Eucalyptus microcarpa	Grey Box	76	Large	СТ	9.12	Haul Road	No			ELA
106	Eucalyptus microcarpa	Grey Box	90	Large	СТ	10.8	Haul Road	No			ELA

ID #	Scientific Name	Common Name	DBH (cm)	Size Class	Туре	TPZ (m)	Project Area	Impacted	Habitat	Notes	Source
107	Eucalyptus microcarpa	Grey Box	100	Large	СТ	12	Haul Road	No			ELA
108	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	10	Small	Patch	2	Haul Road	No			WSP
109	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	4	Small	Patch	2	Haul Road	No			WSP
110	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	53	Small	Patch	6.36	Haul Road	No			WSP
111	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	4	Small	Patch	2	Haul Road	No			WSP
112	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	7	Small	Patch	2	Haul Road	No			WSP
113	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	20	Small	Patch	2.4	Haul Road	No			WSP
114	Eucalyptus microcarpa	Grey Box	12	Small	Patch	2	Haul Road	No			WSP
115	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	26	Small	Patch	3.12	Haul Road	No			WSP
116	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	46	Small	Patch	5.52	Haul Road	No			WSP
117	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	26	Small	Patch	3.12	Haul Road	No			WSP
118	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	5	Small	Patch	2	Haul Road	No			WSP
119	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	35.6	Small	Patch	4.272	Haul Road	No			WSP
120	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	39.2	Small	Patch	4.704	Haul Road	No			WSP
121	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	25	Small	Patch	3	Haul Road	No			WSP
122	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	47	Small	Patch	5.64	Haul Road	No			WSP
123	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	55	Small	Patch	6.6	Haul Road	No			WSP
124	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	84	Large	СТ	10.08	Haul Road	No			WSP
125	Eucalyptus microcarpa	Grey Box	42	Small	Patch	5.04	Haul Road	No			WSP
126	Eucalyptus microcarpa	Grey Box	145	Large	СТ	15	Haul Road	No			WSP

ID #	Scientific Name	Common Name	DBH (cm)	Size Class	Туре	TPZ (m)	Project Area	Impacted	Habitat	Notes	Source
127	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	48	Small	Patch	5.76	Haul Road	No			WSP
128	Eucalyptus leucoxylon subsp. Leucoxylon	Yellow Gum	25	Small	Patch	3	Haul Road	No			WSP

<u>Table Legened</u>

CT – Canopy Tree

ST – *Scattered Tree*

Appendix E Significant Impact Assessments



E1 Blue-winged Parrot Significant Impact Assessment

 Table E.1
 Blue-winged Parrot Neophema chrysostoma Significant Impact Assessment

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO M MITIGATION MEASUR
Lead to a long-term decrease in the size of an important population of a species	The project will result in direct loss of approximately 36.884 ha of grassy woodlands habitat commonly utilised by Blue-winged Parrot. The species also occupies cleared areas, including pastures and other agricultural areas (Pizzey and Knight, 2007). Blue-winged Parrot has not been recorded in the project area, and no important populations are known to occur within the broader woodland patch contiguous with the project area. Due to the widespread foraging nature of the Blue-winged Parrot and the retention of the surrounding woodland, it is unlikely that the project will lead to a long-term population decrease of Blue-winged Parrot.	Low	 All measures prescribed within Section 5, including: All trees to be removed are checked by a suitably qualified ecologist/wildlife handler and 'flushing' or fauna salvage is undertaken where necessary. Construction activities are limited to construction footprint. No-go zones are implemented to ensure habitat adjacent to the works area is not impacted. 	With the implementation mitigation measures, ther long-term decrease in the important population of t
Reduce the area of occupancy of an important population	The project will remove 36.884 ha of suitable Blue-winged Parrot woodland foraging habitat. However, there is widespread suitable foraging habitat across the landscape locally and wider, in the contiguous larger woodland patch and the surrounding farmland. The removal of vegetation for the project is unlikely to reduce the area of occupancy of the species.	Low	As above.	With the implementation mitigation measures, ther risk that the proposed wo reduction in the area of o Blue-winged Parrot.
Fragment an existing important population into two or more populations	Due to the high mobility and migratory nature of the Blue-winged Parrot, it is highly unlikely that the project will result in in the fragmentation of the population into more than one population.	Low	As above.	With the implementation mitigation measures, ther fragmenting the existing two or more populations.
Adversely affect habitat critical to the survival of a species	 The Conservation Advice for Blue-winged Parrot (DCCEEW, 2023d) defines habitat critical to the survival of the species as areas of: — Foraging and staging habitatsincluding: grasslands, grassy woodlands, and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs. Clearing, fragmentation, or degradation of critical habitat for the species should be avoided, and any known or likely habitat is to be considered as habitat critical to the survival of Blue-winged Parrot. All woodland habitat within the impact area meets the definition of habitat critical to the survival of Blue-winged Parrot. All woodland habitat within the impact area meets the definition of habitat critical to the survival of Blue-winged Parrot. Approximately 36.884 ha of suitable foraging and nesting habitat deemed critical to the species' survival. However, this species is relatively wide-spread, foraging in an array of woodland habitats, and is known to occupy cleared areas, including pastures and other agricultural areas (Pizzey and Knight, 2007). There is also a substantial area of suitable habitat for this species, including in areas surrounding and contiguous with the project area. Therefore, despite the loss of 36.884 ha of critical habitat, the species is unlikely to be significantly impacted by the proposed vegetation loss. 	Low	While the footprint of the proposed quarry area and haul roads have been refined and the principles of avoid and minimise influence areas of native vegetation clearing, the works will still result in clearance of critical habitat for Blue- winged Parrot. Measures outlined in Section 5 implemented.	The clearance of approxi of woodland habitat pose significant impact to Blue

MNES WITH RES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
of the proposed re is low risk of size of an he species.	Low
of the proposed re is low residual rks will result in a ccupancy for	Low
of the proposed re is low risk of population into	Low
mately 36.884 ha s a low risk of e-winged Parrot.	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Disrupt the breeding cycle of an important population	The species breeds predominantly in Tasmania, though it also breeds in southern Victoria in heathy woodlands and wet forests that have recently been subject to fire or logging (DCCEEW, 2023d). No known populations have been recorded within the wider woodland patch contiguous with the project area (approximately 570 ha).	Low	No specific mitigation measures required to mitigate this risk.	There is low risk of impacts to the breeding cycle of Blue-winged Parrot as a result of the project.	Low
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Approximately 36.884 ha of woodland containing suitable foraging habitat for Blue-winged Parrot will be removed. However, the contiguous woodland and surrounding farmland contains foraging habitat that is suitable for this species. Overall, the vegetation clearing required for this project is unlikely to result in the population decline of the Blue-winged Parrot.	Low	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area.	With the implementation of the proposed mitigation measures, there is low risk of habitat loss to the extent that the species is likely to decline.	Low
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	It is not expected that additional invasive species will establish in the project area as a result of the proposed works. While there are a number of weed species already present within the project area, mitigation measures can be implemented to minimise their impacts. European Red Fox * <i>Vulpes vulpes</i> has been recorded within the project area previously, and it is expected that Feral Cat * <i>Felis catus</i> is present in the area, as the species is widespread in open and agricultural landscapes.	Low	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area. Predator control measures can be implemented as part of the CEMP and ongoing operations of the proposed project.	With the implementation of the proposed mitigation measures, there is low risk of invasive species becoming established in Blue-winged Parrot habitat.	Low
Introduce disease that may cause the species to decline	The project is unlikely to introduce disease that may cause the species to decline. Indirectly, Myrtle Rust <i>Phytophthora</i> root fungus may be introduced to Eucalyptus trees during works. These diseases can cause tree deaths and therefore, ultimately reduce the availability of feeding habitat for the species.	Low	Standard <i>Phytophthora</i> controls to be implemented as outlined in the CEMP.	There is low residual risk of the spread of disease as a result of the proposed works.	Low
Interfere substantially with the recovery of the species.	The proposed clearance of approximately 36.884 ha associated with the project will decrease the availability of woodland foraging habitat. However, this extent is part of a larger area of suitable woodland and agricultural foraging habitat, therefore the area cleared will have limited impacts on the recovery of this species.	Low	All measures as described above.	With the implementation of the proposed mitigation measures, there is low risk that the proposed works will substantially interfere with the recovery of Blue-winged Parrot.	Low

E2 Brown Treecreeper Significant Impact Assessment

 Table E.2
 Brown Treecreeper Climacteris picumnus victoriae Significant Impact Assessment

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Lead to a long-term decrease in the size of an important population of a species	 While the project area is contiguous with broader areas of undisturbed suitable habitat, the clearance of approximately 36.884 ha of habitat will further reduce available resources. Population density of the species has undergone significant decline in the last 15 years, with declines occurring in habitat fragments under 300 ha, where these fragments have been isolated for more than 50 years (DCCEEW, 2023b). The effects of fragmentation continue for at least 50 years post-fragmentation, with loss of genetic diversity and gene flow of particular concern. 	Moderate	 All measures prescribed within Section 5, including: All trees to be removed are checked by a suitably qualified ecologist/wildlife handler and 'flushing' or fauna salvage is undertaken where necessary. Construction activities are limited to construction footprint. No-go zones are implemented to ensure habitat adjacent to the works area is not impacted. 	While the proposed works involve habitat clearance, any long-term declines in Brown Treecreeper population in the broader habitat patch are likely to arise from genetic impacts from ongoing isolation and after-effects of fragmentation on a landscape scale, not the project.	Low
Reduce the area of occupancy of an important population	The project will involve clearing approximately 36.884 ha of suitable woodland habitat for the species. Removal of this habitat will reduce the area of occupancy for the species, however, the project area is contiguous with wider extents of suitable habitat.	High	As above.	While the implementation of the proposed mitigation measures will prevent loss of surrounding habitat, the proposed works will still result in a reduction in the area of occupancy of the species.	High
Fragment an existing important population into two or more populations	The project area is contiguous with wider extents of suitable woodland vegetation, with much of the development occurring on the edge of the woodland habitat. The species is highly mobile and is therefore unlikely to experience population fragmentation as a result of the works.	Low	As above.	With the implementation of the proposed mitigation measures, there is low risk of fragmenting the existing population into two or more populations.	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Adversely affect habitat critical to the survival of a species	 The approved Conservation Advice for Brown Treecreeper (DCCEEW, 2023b) defines habitat critical to the survival of the species as areas featuring: <i>Relatively undisturbed grassy woodland with native understorey</i> <i>Habitat structure should be quite open at ground level so that birds are able to feed on or near the ground and maintain vigilance against predators</i> <i>Large living and dead trees which are essential for roosting and nesting sites and for foraging</i> <i>Fallen timber which provides essential foraging habitat</i> <i>Hollows in standing dead or live trees and tree stumps are also essential for nesting.</i> Clearing, fragmentation, or degradation of critical habitat for the species should be avoided, and any known or likely habitat is to be considered as habitat critical to the survival of Brown Treecreeper. The species has been recorded in the project area meets the criteria listed above to be considered habitat critical to the survival of the species. Approximately 36.884 ha of this critical habitat is proposed to be cleared for the project. 	High	While the footprint of the proposed quarry area and haul roads have been refined and the principles of avoid and minimise influence areas of native vegetation clearing, the works will still result in clearance of critical habitat for Hooded Robin.Measures outlined in Section 5, particularly those pertaining to No-go Zones, should be implemented to prevent degradation of surrounding habitat.	The proposed mitigation measures will prevent degradation of surrounding habitat, however, the clearance of approximately 36.884 ha of critical habitat, as well as potential disturbance arising from construction and operation, poses a moderate to high risk of significant impact to Brown Treecreeper.	High
Disrupt the breeding cycle of an important population	While the direct effects of the development on Brown Treecreeper breeding cycles are unknown, the project involves the clearance of approximately 36.884 ha of suitable breeding habitat for the species. The species' greatest breeding success is typically in habitat with lower shrub density, moderate ground cover, and greater amounts of woody debris and other foraging substrate (DCCEEW, 2023b). Other pressures such as vehicle movement, lighting, industrial noise, dust, etc may disrupt the breeding cycle of the population. The effects of these pressures may extend beyond the project area, influencing the breeding cycle in adjacent retained habitat.	High	Construction noise and activity impacts can be mitigated by undertaking vegetation clearance and construction works outside the species' breeding period (July-November). Barriers to mitigate visual, light, and noise disturbance should be implemented for ongoing operational works. If works are to be undertaken at night, lighting should be directed to works areas only and should not point towards habitat. Dust suppression measures should be implemented in the CEMP and ongoing operational procedure to prevent impacts outside the project area.	With the implementation of the proposed mitigation measures, there is moderate risk that the breeding cycle will be disrupted by ongoing operational disturbance.	Moderate
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The clearance of approximately 36.884 ha of habitat is less likely to lead to direct decline of the species, as the project area is contiguous with a wider area (approx. 570 ha) of suitable habitat.	Moderate	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area.	With the implementation of the proposed mitigation measures, the risk of impacts to surrounding habitat is minimised.	Moderate

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	It is not expected that additional invasive species will establish in the project area as a result of the proposed works. While there are a number of weed species already present within the project area, mitigation measures can be implemented to minimise their impacts. European Red Fox <i>*Vulpes vulpes</i> has been recorded within the project area previously, and it is expected that Feral Cat <i>*Felis catus</i> is present in the area, as the species is widespread in open and agricultural landscapes.	Low	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area. Predator control measures can be implemented as part of the CEMP and ongoing operations of the proposed project.	With the implementation of the proposed mitigation measures, the risk of invasive species establishment is minimised.	Low
Introduce disease that may cause the species to decline	The project is unlikely to introduce disease that may cause the species to decline. Indirectly, Myrtle Rust and <i>Phytophthora</i> root fungus may be introduced to Eucalyptus trees during works. These diseases can cause tree deaths and therefore, ultimately reduce the availability of feeding habitat for the species.	Low	Standard <i>Phytophthora</i> controls to be implemented as outlined in the CEMP.	There is low residual risk of the spread of disease as a result of the proposed works.	Low
Interfere substantially with the recovery of the species	The clearing of approximately 36.884 ha of critical habitat for this species represents a loss in available foraging and breeding habitat. There is widespread suitable habitat contiguous with the project area, however, other effects arising from the proposed works (construction and operations) have the potential to affect breeding cycles and lead to long-term decline of the local population further to genetic pressures arising from the long-term isolation of the wider woodland patch from wider remnant vegetation.	High	As above.	The proposed mitigation measures will prevent degradation of surrounding habitat, however, the clearance of approximately 36.884 ha of critical habitat, as well as potential disturbance arising from construction and operation, poses a moderate to high risk of significant impact to Brown Treecreeper.	High

E3 Diamond Firetail Significant Impact Assessment

 Table E.3
 Diamond Firetail Stagonopleura guttata Significant Impact Assessment

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MITIGATION MEASU
Lead to a long-term decrease in the size of an important population of a species	The species has declined significantly in the last decade, with local declines noted in southern and eastern populations (DCCEEW, 2023e). Much of this decline has been attributed to habitat loss and the spread of exotic pasture grasses. The species has been recorded both within the project area and the wider patch of woodland vegetation (approximately 570 ha). As there is widespread suitable habitat contiguous with the project area, and the species is highly mobile, it is unlikely that the proposed clearing of approximately 36.884 ha of habitat will lead to long-term declines of Diamond Firetail. The effects of construction and operational disturbance (vehicle movement, lighting, industrial noise, etc) may negatively influence ongoing breeding and dispersal success and impact long-term population numbers.	High	 All measures prescribed within Section 5, including: All trees to be removed are checked by a suitably qualified ecologist/wildlife handler and 'flushing' or fauna salvage is undertaken where necessary. Construction activities are limited to construction footprint. No-go zones are implemented to ensure habitat adjacent to the works area is not impacted. 	With the implementation mitigation measures, the residual risk that these w long-term decrease in the population within the bro
Reduce the area of occupancy of an important population	The project will involve clearing approximately 36.884 ha of suitable woodland habitat for the species. Removal of this habitat will reduce the area of occupancy for the species. However, the project area is contiguous with wider extents of suitable habitat.	Moderate	As above.	While the implementation mitigation measures will surrounding habitat, the will still result in a reduct occupancy of the species
Fragment an existing important population into two or more populations	The project area is contiguous with wider extents of suitable woodland vegetation, with much of the development occurring on the edge of the woodland habitat. The species is highly mobile and is therefore unlikely to experience population fragmentation as a result of the works.	Low	As above.	With implementation of mitigation measures, the fragmenting the existing two or more populations
Adversely affect habitat critical to the survival of a species	 The Conservation Advice (DCCEEW, 2023e) for Diamond Firetail defines critical habitat for the survival of the species as areas of: <i>Eucalypt, acacia, or casuarina woodlands, open forest and other lightly timbered habitats</i> <i>Low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding.</i> Clearing, fragmentation, or degradation of critical habitat should be avoided, and any known or likely habitat is to be considered habitat critical to the survival of Diamond Firetail. The species has been recorded in the project area and surrounding woodland on multiple occasions. The habitat within the project area meets the criteria above to be considered habitat critical to the survival of the species. Approximately 36.884 ha of this critical habitat is proposed to be cleared for the project. 	High	While the footprint of the proposed quarry area and haul roads have been refined and the principles of avoid and minimise influence areas of native vegetation clearing, the works will still result in the clearance of critical habitat. Measures outlined in Section 5, particularly those pertaining to No-go Zones, should be implemented to prevent degradation of surrounding habitat.	The proposed mitigation prevent degradation of su however, the clearance of 36.884 ha of known suita Diamond Firetail represe impact to critical habitat

INES WITH RES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
of the proposed e is moderate orks will lead to a size of the ader habitat.	Moderate
n of the proposed prevent loss of proposed works tion in the area of	Moderate
he proposed e is low risk of population into	Low
measures will prounding habitat, f approximately ble habitat for nts an adverse for the species.	High

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Disrupt the breeding cycle of an important population	While the direct effects of the development on Diamond Firetail breeding cycle are unknown, the project involves the clearance of approximately 36.884 ha of suitable breeding habitat for the species. Other pressures such as vehicle movement, lighting, industrial noise, dust, etc may disrupt the breeding cycle of the population. The effects of these pressures may extend beyond the project area, influencing the breeding cycle in adjacent retained habitat.	High	Construction noise and activity impacts can be mitigated by undertaking vegetation clearance and construction works outside the species' breeding period (August-January). Barriers to mitigate visual, light, and noise disturbance should be implemented for ongoing operational works.	With the implementation of the proposed mitigation measures, there is moderate risk that the breeding cycle will be disrupted by ongoing operational disturbance.	Moderate
			If works are to be undertaken at night, lighting should be directed to works areas only and should not point towards habitat.		
			Dust suppression measures should be implemented to prevent impacts outside the project area.		
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The clearance of approximately 36.884 ha of suitable Diamond Firetail habitat will decrease the extent and availability of suitable habitat. The project area is contiguous with a broader patch of suitable woodland habitat; however, loss of habitat has been shown to be a key factor in the decline of the species (DCCEEW, 2023e).	Moderate	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area.	With the implementation of the proposed mitigation measures, the risk of impacts to surrounding habitat is minimised.	Moderate
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	It is not expected that additional invasive species will establish in the project area as a result of the proposed works. While there are a number of weed species already present within the project area, mitigation measures can be implemented to minimise their impacts. European Red Fox <i>*Vulpes vulpes</i> has been recorded within the project area previously, and it is expected that Feral Cat <i>*Felis catus</i> is present in the area, as the species is widespread in open and agricultural landscapes.	Low	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area. These measures are particularly important to prevent the spread of exotic pasture grasses into the surrounding habitat, which has been shown to be a threat to Diamond Firetail (DCCEEW, 2023e).	With the implementation of the proposed mitigation measures, there is low risk of invasive species becoming established in Diamond Firetail habitat.	Low
			Predator control measures can be implemented as part of the CEMP and ongoing operations of the proposed project.		
Introduce disease that may cause the species to decline	The project is unlikely to introduce disease that may cause the species to decline. Indirectly, Myrtle Rust and <i>Phytophthora</i> root fungus may be introduced to Eucalyptus trees during works. These diseases can cause tree deaths and therefore, ultimately reduce the availability of feeding habitat for the species.	Low	Standard <i>Phytophthora</i> controls to be implemented as outlined in the CEMP.	There is low residual risk of the spread of disease as a result of the proposed works.	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Interfere substantially with the recovery of the species	The clearing of approximately 36.884 ha of critical habitat for this species represents a loss in available foraging and breeding habitat. There is widespread suitable habitat contiguous with the project area, however, other effects arising from the proposed works (construction and operations) have the potential to affect breeding cycles and lead to long-term decline of the local population.	High	All measures as described above.	The proposed mitigation measures will prevent degradation of surrounding habitat, however, the clearance of approximately 36.884 ha of critical habitat, as well as potential disturbance arising from construction and operation, poses a moderate to high risk of significant impact to Diamond Firetail.	High

E4 Hooded Robin Significant Impact Assessment

 Table E.4
 Hooded Robin Melanodryas cucullata Significant Impact Assessment

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Lead to a long-term decrease in the size of a population	The species has declined significantly in the last decade, with rapid declines noted in southern and eastern populations (DCCEEW, 2023c). Much of this decline has been attributed to habitat loss. The individuals recorded during targeted surveys likely form part of a wider population within the contiguous woodland area (approximately 570 ha of suitable habitat). The project area contains suitable breeding and foraging habitat for the species, and impacts including vegetation clearing and ongoing operational disturbance (vehicle movement, lighting, industrial noise, etc) may negatively influence ongoing breeding and dispersal success and therefore lead to long-term declines.	High	 All measures prescribed within Section 5, including: All trees to be removed are checked by a suitably qualified ecologist/wildlife handler and 'flushing' or fauna salvage is undertaken where necessary. Construction activities are limited to construction footprint. No-go zones are implemented to ensure habitat adjacent to the works area is not impacted. 	With the implementation of the proposed mitigation measures, there is moderate residual risk that these works will lead to a long-term decrease in the size of the population within the broader habitat.	High
Reduce the area of occupancy of the species	The project will involve clearing approximately 36.884 ha of suitable woodland habitat for the species. Removal of this habitat will reduce the area of occupancy for the species, however, the project area is contiguous with wider extents of suitable habitat.	High	As above.	While the implementation of the proposed mitigation measures will prevent loss of surrounding habitat, the proposed works will still result in a reduction in the area of occupancy of the species.	High
Fragment an existing population into two or more populations	The project area is contiguous with wider extents of suitable woodland vegetation, with much of the development occurring on the edge of the woodland habitat. The species is highly mobile and is therefore unlikely to experience population fragmentation as a result of the works.	Low	As above.	With the implementation of the proposed mitigation measures, there is low risk of fragmenting the existing population into two or more populations.	Low
Adversely affect habitat critical to the survival of a species	 The Conservation Advice (DCCEEW, 2023c) for the species outlines critical habitat for the survival of Hooded Robin as areas of: Dry eucalypt and acacia woodlands and shrubland remnants with an open understorey, some grassy areas and a complex ground layer, often in or near clearings or open areas Structurally diverse habitats with mature eucalypts, saplings, small shrubs, and a ground layer of moderately tall native grasses Standing dead or live trees and tree stumps Moderately deep to deep soils, rocks and fallen timber which provides essential foraging habitat. Clearing, fragmentation, or degradation of critical habitat for the species should be avoided, and any known or likely habitat is to be considered as habitat critical to the survival of Hooded Robin. The species has been recorded in the project area during targeted surveys. The habitat within the project area meets the criteria listed above to be considered habitat critical habitat is proposed to be cleared for the project. 	High	While the footprint of the proposed quarry area and haul roads have been refined and the principles of avoid and minimise influence areas of native vegetation clearing, the works will still result in clearance of critical habitat for Hooded Robin.Measures outlined in Section 5, particularly those pertaining to No-go Zones, should be implemented to prevent degradation of surrounding habitat.	The proposed mitigation measures will prevent degradation of surrounding habitat, however, the clearance of approximately 36.884 ha of critical habitat poses a moderate to high risk of significant impact to Hooded Robin.	High

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Disrupt the breeding cycle of a population	While the direct effects of the development on Hooded Robin breeding cycle are unknown, the project involves the clearance of approximately 36.884 ha of suitable breeding habitat for the species. Other pressures described above, such as vehicle movement, lighting, industrial noise, dust, etc may disrupt the breeding cycle of the population. The effects of these pressures may extend beyond the project area, influencing the breeding cycle in adjacent retained habitat.	Moderate/high	Construction noise and activity impacts can be mitigated by undertaking vegetation clearance and construction works outside the species' breeding period (July-November). Barriers to mitigate visual, light, and noise disturbance should be implemented for ongoing operational works. If works are to be undertaken at night, lighting should be directed to works areas only and should not point towards habitat. Dust suppression measures should be implemented to prevent impacts outside the project area.	With the implementation of the proposed mitigation measures, there is moderate risk that the breeding cycle will be disrupted by ongoing operational disturbance.	Moderate
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The clearance of approximately 36.884 ha of suitable Hooded Robin habitat will decrease the extent and availability of suitable habitat. The project area is contiguous with a broader patch of suitable woodland habitat; however, loss of habitat has been shown to be a key factor in the decline of the species (DCCEEW, 2023c).	Moderate	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area.	With the implementation of the proposed mitigation measures, the risk of impacts to surrounding habitat is minimised.	Moderate
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	It is not expected that additional invasive flora species will establish in the project area as a result of the proposed works. While there are a number of weed species already present within the project area, mitigation measures can be implemented to minimise their impacts. European Red Fox * <i>Vulpes vulpes</i> has been recorded within the project area previously, and it is expected that Feral Cat * <i>Felis catus</i> is present in the area, as the species is widespread in open and agricultural landscapes.	Low	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area. Predator control measures can be implemented as part of the CEMP and ongoing operations of the proposed project.	With the implementation of the proposed mitigation measures, there is low risk of invasive species becoming established in Hooded Robin habitat.	Low
Introduce disease that may cause the species to decline	The project is unlikely to introduce disease that may cause the species to decline. Indirectly, Myrtle Rust and <i>Phytophthora</i> root fungus may be introduced to Eucalyptus trees during works. These diseases can cause tree deaths and therefore, ultimately reduce the availability of feeding habitat for the species.	Low	Standard <i>Phytophthora</i> controls to be implemented as outlined in the CEMP.	There is low residual risk of the spread of disease as a result of the proposed works.	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Interfere with the recovery of the species	The clearing of approximately 36.884 ha of critical habitat for this species represents a loss in available foraging and breeding habitat. There is widespread suitable habitat contiguous with the project area, however, other effects arising from the proposed works (construction and operations) have the potential to affect breeding cycles and lead to long-term decline of the local population.	High	As above.	The proposed mitigation measures will prevent degradation of surrounding habitat, however, the clearance of approximately 36.884 ha of critical habitat, as well as potential disturbance arising from construction and operation, poses a moderate to high risk of significant impact to Hooded Robin.	High

E5 Southern Whiteface Significant Impact Assessment

 Table E.5
 Southern Whiteface Aphelocephala leucopsis Significant Impact Assessment

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Lead to a long-term decrease in the size of an important population of a species	 According to the Significant Impact Guidelines (DoE, 2013) an 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: key source populations either for breeding or dispersal populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range. Southern Whiteface is known to occur locally, with several recorded sightings within the local area, including one individual recorded within the broader property. The local population at the site is not known or considered to be an important population based on the above definition and information outlined in the species conservation advice as the population is not at the edge of the species' range, and the population has not been identified as a key source population for breeding or dispersal, or as necessary for maintaining genetic diversity for this species (DCCEEW, 2023a). The project will result in the direct loss of approximately 36.884 ha of suitable grassy woodland habitat. However, due to the retention of the surrounding woodland habitat and the species wide distribution range across Australia, it is unlikely that the project will lead to a long-term decrease in the size of an <u>important population</u> of Southern Whiteface. 	Low	 All measures prescribed within Section 5, including: All trees to be removed are checked by a suitably qualified ecologist/wildlife handler and 'flushing' or fauna salvage is undertaken where necessary. Construction activities are limited to construction footprint. No-go zones are implemented to ensure habitat adjacent to the works area is not impacted. 	With the implementation of the proposed mitigation measures, there is low risk of long-term decrease in the size of an important population of the species.	Low
Reduce the area of occupancy of an important population	The proposed works will result in the removal of 36.884 ha of suitable habitat for this species at the impact site, however this removal will not result in a range reduction for this species given substantial suitable habitat available within the local area. The population present within and surrounding the study area is also not considered an important population. Therefore, despite the proposed vegetation clearance and likely noise/light disturbance associated with building and operating a quarry, the project is not considered likely to reduce the area of occupancy of an <u>important</u> <u>population</u> of Southern Whiteface.	Low	Measures outlined in Section 5, particularly those pertaining to No-go Zones, should be implemented to prevent additional clearing and degradation of surrounding habitat.	With the implementation of the proposed mitigation measures, there is low residual risk that the proposed works will result in a reduction in the area of occupancy for an important population of Southern Whiteface.	Low
Fragment an existing important population into two or more populations	The proposed project is located towards the western boundary of the larger 560 ha property, meaning the vegetation to the north, east and south of the proposed quarry will largely remain connected. This will enable the Southern Whiteface to disperse throughout the broader property, an important consideration given the sedentary nature of this species. Therefore, despite the anticipated vegetation loss of 36.884 ha, it is highly unlikely that the project will result in the fragmentation of an <u>important population</u> of Southern Whiteface into two or more populations.	Low	Measures outlined in Section 5, particularly those pertaining to No-go Zones, should be implemented to prevent additional clearing and degradation of surrounding habitat.	With the implementation of the proposed mitigation measures, there is low risk of fragmenting the an existing important Southern Whitface population into two or more populations.	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Adversely affect habitat critical to the survival of a species	 The Conservation Advice for Southern Whiteface (DCCEEW, 2023d) defines habitat critical to the survival of the species as areas of: <i>relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;</i> <i>habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat;</i> <i>living and dead trees with hollows and crevices which are essential for roosting and nesting.</i> Any known or likely habitat should be considered as habitat critical to the survival of Southern Whiteface. Clearing, fragmentation, or degradation of critical habitat for the species should be avoided. All woodland habitat within the impact area meets the definition of habitat critical to the survival of Southern Whiteface. Approximately 36.884 ha of suitable foraging and nesting habitat critical to the species' survival. 	High	While the footprint of the proposed quarry area and haul roads have been refined and the principles of avoid and minimise have been applied to the areas of native vegetation clearing, the works will result in clearance of critical habitat for Southern Whiteface. Measures outlined in Section 5, particularly those pertaining to No-go Zones, should be implemented to prevent additional clearing and degradation of surrounding habitat.	Even with efforts to reduce the project footprint and to implement mitigation measures, the clearance of 36.884 ha means there is still a high residual risk of adverse impacts to habitat that is deemed critical to the species' survival.	High
Disrupt the breeding cycle of an important population	The project will result in the loss of approximately 36.884 ha of suitable Southern Whiteface foraging and breeding habitat, in addition to noise and light disturbance. While these activities will likely result in some disturbance to the breeding activities for this population within the impact area, there is sufficient suitable habitat surrounding the project area capable of supporting this species during the breeding season (i.e. July – October). This population is also not considered an important population. Therefore, the project, is considered unlikely to disrupt the breeding cycle of an <u>important population</u> of Southern Whiteface.	Low	Construction noise and activity impacts can be mitigated by undertaking vegetation clearance and construction works outside the species' breeding period (July-August). Barriers to mitigate visual, light, and noise disturbance should be implemented for ongoing operational works. If works are to be undertaken at night, lighting should be directed to works areas only and should not point towards habitat. Dust suppression measures should be implemented to prevent impacts outside the project area.	There is low risk of impacts to the breeding cycle of an important population of Southern Whiteface as a result of the project.	Low
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	It is likely that habitat loss and fragmentation is the primary cause of decline in Southern Whiteface, especially in the parts of the species' range where there has been complete removal of habitat for intensive agriculture (Ehmke et al., 2021). This is relevant given that the project area is located in a highly fragmented agricultural landscape, where only small vegetation patches and long linear corridors of vegetation persist within a 6 km radius of the site. Approximately 36.884 ha of woodland containing suitable Southern Whiteface habitat will be removed as a result of the proposed project, thereby decreasing the availability of suitable habitat for this species in the local area. However, this area of loss is contiguous with a larger patch of suitable woodland habitat capable of supporting the species. It is expected that the surrounding woodland will provide habitat for Southern Whiteface individuals that may be displaced as a result of the project. Considering the amount of habitat in the immediate vicinity that will not be impacted, the loss of habitat associated with the project is considered unlikely to result in the decline of the Southern Whiteface.	Low	Measures prescribed in Section 5 and as described above, particularly regarding the strict implementation of No-go Zones.	There is low risk of direct species decline following the implementation of the proposed mitigation measures.	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO MNES WITH MITIGATION MEASURES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	European Red Fox *Vulpes vulpes has previously been recorded within the project area, and Feral Cat *Felis catus is highly likely present in the area given the species is widespread in open and agricultural landscapes. While numerous weed species are already present within the project area, including several CaLP Act-listed weeds, mitigation measures can be implemented to minimise their spread and the establishment of new weed infestations at the site and into surrounding habitat. Therefore, it is not expected that additional invasive species that are harmful to Southern Whiteface will establish in the project area as a result of the proposed works.	Low	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area. Predator control measures can be implemented as part of the CEMP and ongoing operations of the proposed project.	With the implementation of the proposed mitigation measures, there is low risk of invasive species becoming established in Southern Whiteface habitat as a result of the proposed works.	Low
Introduce disease that may cause the species to decline	The project is unlikely to introduce disease that may cause the species to decline. Indirectly, Myrtle Rust and <i>Phytophthora</i> root fungus may be introduced to Eucalyptus trees during works. These diseases can cause tree deaths and therefore, ultimately reduce the availability of feeding habitat for the species.	Low	Standard <i>Phytophthora</i> controls to be implemented as outlined in the CEMP.	There is low residual risk of the spread of disease as a result of the proposed works.	Low
Interfere substantially with the recovery of the species.	The proposed clearance of approximately 36.884 ha associated with the project will decrease the availability of suitable habitat that is deemed critical to the species' survival. One of the recovery actions stipulated in the Conservation Advice for Southern Whiteface (DCCEEW, 2023a) is to ' <i>Cease all land clearing of habitat critical to the survival of southern whiteface</i> ' A recovery plan for the species is also recommended by the Threatened Species Scientific Committee due to the species ongoing decline, and the precautionary principle should be applied to safeguard all known and potential suitable habitats. Considering the emphasis placed on preserving suitable Southern Whiteface habitat, the project is considered likely to substantially interfere with the recovery of the species.	Moderate	All measures as described above.	Even with efforts to reduce the project footprint and to implement mitigation measures, the clearance of 36.884 ha of critical habitat means there is still moderate residual risk of the project substantially interfering with the recovery of Southern Whiteface.	Moderate

E6 Swift Parrot Significant Impact Assessment

 Table E.6
 Swift Parrot Lathamus discolor Significant Impact Assessment

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO N MITIGATION MEASU
Lead to a long-term decrease in the size of a population	The project will result in direct loss of approximately 24.71 ha (67% of the total 36.884 ha to be removed) of woodland habitat utilized by Swift Parrots. This woodland habitat is likely to be used primarily as a foraging location during the species' mainland dispersal. Due to the widespread foraging nature of the Swift Parrot and the retention of the surrounding woodland, it is unlikely that the project will lead to a long-term population decrease of Swift Parrots.	Low	 All measures prescribed within Section 5, including: All trees to be removed are checked by a suitably qualified ecologist/wildlife handler and 'flushing' or fauna salvage is undertaken where necessary. Construction activities are limited to construction footprint. No-go zones are implemented to ensure habitat adjacent to the works area is not impacted. 	There is low risk of long Swift Parrot as a result of these mitigation measure
Reduce the area of occupancy of the species	The project will remove 24.71 ha of potential Swift Parrot foraging habitat. While the species is unlikely to occupy the area on a permanent or consistent basis as it forages opportunistically on flowering eucalypts, the removal of this resource will force this species to forage elsewhere, therefore decreasing the area of occupancy of Swift Parrots.	High	As above.	With the implementation mitigation measures, then residual risk of area of oc Parrot. Implementation o will prevent further habit outside the work area.
Fragment an existing population into two or more populations	Due to the high mobility and migratory nature of the Swift Parrot, it is highly unlikely that the project will result in in the fragmentation of the population into more than one population.	Low	No specific mitigation measures required to There is low ris fragmentation a	
Adversely affect habitat critical to the survival of a species	The Swift Parrot has been observed within the broader project area in 1997, 2001, 2011, 2021 and 2023. This area contains woodland habitats which contains various flowering trees. Swift Parrot foraging habitat is nectar from flowering eucalypts, which are found throughout the project area. Removal of vegetation will result in the destruction of these woodland habitats, in turn adversely affecting habitat which is critical to the species' survival.	High	Measures prescribed in Section 5 (as above), with particular emphasis on weed control measures as outlined in the project CEMP such as vehicle and plant washdown to ensure weeds are not transported on site from other locations to prevent degradation of suitable habitat immediately adjacent to the works area.	
Disrupt the breeding cycle of a population	The species does not breed at the project area or in the locality (non- breeding migrant).	Low	No specific mitigation measures required to mitigate this risk.	There is low risk of impa breeding cycle of Swift F the project.

MNES WITH RES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
-term decline for f this project with s implemented.	Low
of the proposed re is still moderate ccupancy for Swift f No-go Zones at destruction	Moderate
lation of the project.	Low
of the proposed re is still moderate mpacts to habitat entation of No-go measures will estruction and work area.	High
cts to the Parrot as a result of	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)	RESIDUAL RISK TO I MITIGATION MEASU
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Approximately 24.71 ha of woodland containing preferred foraging trees for Swift Parrots will be removed. However, the surrounding woodland contains a large number of foraging trees that are suitable for this species. Overall, the vegetation clearing required for this project is unlikely to result in the population decline of the Swift Parrot. Modification of habitat such as suppression of regeneration is also considered a threat, however, the surrounding woodland contains sufficient mature trees for ongoing habitat recruitment such that surrounding habitat quality is unlikely to be affected.	Low	Measures prescribed in Section 5 and as described above.	There is low risk of direct following the implement proposed mitigation mea
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Competition from invasive species, particularly honeybees (<i>Apis mellifera</i>) is considered a key threat to the species. While the clearing of 24.71 ha of foraging habitat will mean increased competition for resources in the surrounding woodland, it is likely that invasive species are already established in the wider area due to agriculture. There is sufficient habitat for these species in the wider area that competition from honeybees is unlikely to pose a significant impact as a result of this habitat clearing.	Low	Implementation of measures prescribed in Section 5.	There is low risk of invas are harmful to Swift Parr established in the surrour result of these works.
Introduce disease that may cause the species to decline	 Psittacine Beak and Feather Disease (PBFD) can impact the Swift Parrot. There will be limited-to-no contact with Swift Parrot individuals required during the project. Therefore, construction activities, and the subsequent continued operational use of the project area, is unlikely to introduce diseases that could cause the species to decline. Indirectly, Myrtle Rust and <i>Phytophthora</i> root fungus may be introduced to Eucalyptus trees during works. These diseases can cause tree deaths and therefore, ultimately reduce the availability of feeding habitat for the species. 	Low/Moderate	Ecologists/wildlife handlers undertaking salvage works will have measures in place to prevent the spread of disease. Standard <i>Phytophthora</i> controls to be implemented as outlined in the CEMP.	With the implementation mitigation measures, then direct or residual species of disease.
Interfere with the recovery of the species	 The National Recovery Plan for the Swift Parrot Lathamus discolor, 2011 states the main threats to this species recovery as being: Habitat loss and alternation Climate change Collision mortality Psittacine Beak and Feather Disease Illegal wildlife capture and trading This project may interfere with the recovery of this species via habitat loss and collision mortality. The vegetation clearing of 24.71 ha of Swift Parrot foraging habitat will decrease their local foraging area, however this extent is part of a larger foraging area Therefore, the area cleared will have limited impacts on the recovery of this species. An increase of traffic resulting from the quarry operations will increase the likelihood of vehicles colliding with Swift Parrots. The site currently receives infrequent traffic, but construction and ongoing operations will introduce vehicles to habitat where they have not been previously.	Low/Moderate	 All measures as described above, with the addition of collision mitigation: Drive slowly around habitat, including on access tracks, particularly during winter months when the species is dispersing through woodland habitat. If a Swift Parrot is struck, contact a qualified ecologist or wildlife rehabilitation centre immediately. 	With the implementation mitigation measures, then the proposed works will interfere with the recover

INES WITH RES APPLIED	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
t species decline ation of the sures.	Low
sive species that ot becoming ading habitat as a	Low
of the proposed e is low risk of decline as a result	Low
of the proposed re is low risk that substantially ry of Swift Parrot.	Low

E7 Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia Significant Impact Assessment

Table E.7 Grey Box Grassy Woodlands Significant Impact Assessment

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)
Reduce the extent of an ecological community	A total of 2.60 ha of GBGW will be removed as a result of the project resulting in a reduced extent of this threatened ecological community.	High	Erect no-go zones to ensure habitat adjacent to th is not disturbed
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The removal of 2.60 ha of the GBGW will result in the fragmentation of the TEC.	High	Erect no-go zones to ensure habitat adjacent to th is not disturbed
Adversely affect habitat critical to the survival of an ecological community	Although the removal of 2.60 ha of GBGW will remove the TEC in the direct area of the project, there is a larger extent of the GBGW within the area. The surrounding area supports a higher density of grasses and shrubs that will remain unimpacted by the project. Due to this large area remaining intact, it is unlikely that the project will affect the overall survival of this ecological community.	Low	Erect no-go zones to ensure habitat adjacent to th is not disturbed
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The excavation of this quarry is expected to be 140 m in depth, resulting in a groundwater sink for the immediate area. Previous studies have shown the ground water to be less than 10 m, which with ultimately be impacted by the excavation of the quarry. Ground water modelling will need to be completed to understand the full extent that the surrounding groundwater will be impacted.	Moderate	Mitigation measures are unknown until full exter quarry's impact on groundwater is understood
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The project area will remove 2.60 ha of GBGW, however, the surrounding area is considered to be an established native grassland containing the GBGW ecological community. This area of removal is not expected to have a major impact to the species composition of the regional area.	Low	Erect no-go zones to ensure habitat adjacent to th is not disturbed

	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
the works	High
he works	High
he works	Low
ent of the	Moderate
he works	Low

SIGNIFICANT IMPACT CRITERIA	RISK TO MNES WITHOUT MITIGATION MEASURES	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH NO MITIGATION MEASURES IMPLEMENTED)	SUGGESTED MITIGATION MEASURE(S)
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Invasive flora species have been recorded within the project area. The expected ground disturbance resulting from quarry works, have the potential to transport and move exotic species via trucks and other machinery. It is likely that invasive species will growth on the edge of disturbed areas. Dust impacts resulting from quarry activities are likely to impact vegetation associated with the GBGW. Dust impacts can result in flora being unable to photosynthesize, therefore resulting in stunted growth or death. Die offs resulting from dust impacts have the potential to increase the extent of the projects impact on the GBGW.	Moderate /High	 Implementation of weed management strategies including: All machinery shall be inspected to ensure are being transferred to the site. Regular inspection of noxious or invasive withe site. All weed infestations must be controlled. Weed / pest control undertaken by suitably personnel. Dust mitigations measures such as: Cease work during times of drought Use dust suppressants during periods with a Conduct regular health checks on vegetation clorroads and work sites
Interfere with the recovery of an ecological community.	There is a potential that the groundwater drawdown will have adverse impacts of the surround ecological communities. Further studies and modelling will need to be conducted to understand the full extent the draw down will have on the ground water table.	Low /Moderate	Refer to the Environmental Management Plan for groundwater specific management measures

	LIKELIHOOD OF A SIGNIFICANT IMPACT (WITH MITIGATION MEASURES IMPLEMENTED)
3	Low
no weeds	
weeds on	
qualified	
high dust ose to	
or	Low

Appendix F



Appendix G Limitation Statement


G1 Legal Limitations

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